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City of Boston Town of Brookline

Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project

EOEA #11865

February 2005

Prepared by: **CDM**

In Association with:

Pressley Associates, Inc.
Vanasse Hangen Brustlin, Inc.



Supplemental Final Environmental Impact Report

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February 15, 2005

Ms. Ellen Roy Herzfelder
Secretary of Environmental Affairs
Attention: MEPA Office
100 Cambridge Street
Boston, MA 02214

Subject: Supplemental Final Environmental Impact Report; EOEA No. 11865
Phase 1 Muddy River Flood Control, Water Quality and
Habitat Enhancement, and Historic Preservation Project

Dear Secretary Herzfelder:

On behalf of the City of Boston and the Town of Brookline, enclosed are three copies of the Supplemental Final Environmental Impact Report (SFEIR) for the Muddy River Project, in compliance with MEPA regulations and the Certificates on the Environmental Notification Form, Draft EIR, and Final EIR, issued on April 24, 1999; April 16, 2002 and May 1, 2003; respectively. Please publish availability of this SFEIR in the next issue of the Environmental Monitor.

As required by Special Review Procedure for this project, this SFEIR was submitted to the Citizens Advisory Committee (CAC) for review 30 days in advance of this formal submittal to MEPA. Comments received on the Final EIR and the Final EIR Certificate have been summarized and addressed in this SFEIR. Full copies of the comment letters are provided in Appendix A.

Many of the SFEIR recipients will receive a CD Rom version of the document, which will also include a paper copy of this letter, the Table of Contents, and the Executive Summary. Those wishing to receive a paper copy of the entire document should contact Margaret Dyson at (617) 635-4505 x6510, Tom Brady at (617) 730-2088, or stop by the Boston Parks and Recreation Department or the Brookline Department of Public Works offices. Copies for public viewing are also available at various repositories in Boston and Brookline (see attached list).

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Ms. Ellen Roy Herzfelder
February 15, 2005
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Very truly yours,

Bruce R. Conklin

Bruce R. Conklin, P.E.
Vice President
Camp Dresser & McKee Inc.

cc: Margaret Dyson, BPRD
Thomas Brady, Town of Brookline



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1010 Massachusetts Avenue, 3rd Floor
Boston, MA 02118

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Attn: Ellen Lipsey
Boston City Hall, Room 805
One City Hall Plaza
Boston, MA 02215

Boston Public Library
Attn: Government Documents
Copley Square Branch
700 Boylston Street
Boston, MA 02116

Brookline Department of Public Works
Attn: Tom Brady
Brookline Town Hall, 4th Floor
333 Washington Street
Brookline, MA 02445

The Emerald Necklace Conservancy
Attn: Simone Auster
Two Brookline Place
Brookline, MA 02445

Frederick Law Olmsted National
Historic Site
Attn: Mark Swartz
National Park Service
99 Warren Street
Brookline, MA 02445

MASCO
Attn: Jan Henderson
375 Longwood Avenue
Boston, MA 02215

Massachusetts Historic Society
Attn: Peter Drummey or William Fowler
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Muddy River Supplemental Final EIR

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Executive Summary

Executive Summary

Rehabilitation of the Emerald Necklace

The Emerald Necklace is a linear park system stretching from Boston Common to Franklin Park. Designed more than a century ago by renowned landscape architect Frederick Law Olmsted, the park system was envisioned to connect downtown Boston's Common, Public Garden and Commonwealth Avenue Mall to the city's emerging neighborhoods. The result is six parks and related waterways that stretch more than six miles from Dorchester to Back Bay and include both Boston and Brookline:

- Franklin Park (Scarboro Pond)
- Arnold Arboretum
- Jamaica Park (Jamaica Pond)
- Olmsted Park (Ward's, Willow, and Leverett Ponds)
- The Riverway
- The Back Bay Fens, which joins the Riverway via the Muddy River

Olmsted Park, The Riverway, and The Back Bay Fens comprise the Muddy River project area, which is the subject of this document.

In the century since the creation of Emerald Necklace, the land surrounding it has been subjected to increasing urbanization – resulting in a decline in the richness and diversity of Olmsted's distinctive landscape:

- Flooding has worsened because there is little natural storage left in the widely paved watershed, and sediment and debris have washed into the river constricting flood-carrying capacity;
- Water quality has deteriorated as an array of natural and man-made compounds are carried off the land surface during rainstorms and deposited into the river and accumulated in the sediment;
- Non-native invasive species of flora such as Phragmites and Japanese knotweed have overtaken portions of the river and bank, pushing out native species, creating safety hazards, eliminating natural habitats, and greatly limiting the diversity of wildlife that can live within the watershed.

The need for rehabilitation of the Emerald Necklace is apparent and was first addressed in 1989 in the Emerald Necklace Parks Master Plan (which was subsequently updated in 2001). The Master Plan recommended more than 52

improvements to rehabilitate and preserve the Emerald Necklace organized into four phases:

- Phase I: Dredging, flood control, water quality improvements, aquatic/riparian habitat enhancement, historic rehabilitation, and best management practices within the Muddy River area (the Back Bay Fens, Riverway, and Olmsted Park and its waterways).
- Phase II: Historic landscape improvements, revegetation, major traffic and pedestrian circulation improvements, major building and vehicular bridge restoration.
- Phase III: Minor traffic circulation improvements, small building and pedestrian bridge restoration.
- Phase IV: Park and water body improvements in the remaining areas of the Emerald Necklace (i.e., Jamaica Park, Arnold Arboretum, and Franklin Park/Scarboro Pond).

The current project, which is the subject of this document, is Phase I of the rehabilitation efforts, referred to as Phase I Muddy River Flood Control, Water Quality and Wildlife Enhancement and Historic Preservation Project.

Project Overview

The project described herein involves a multidisciplinary approach to improving the Muddy River system, including both river and parkland that are part of the park system referred to as the Emerald Necklace, located in Boston and Brookline, Massachusetts. Components of the project are derived from previous engineering and historical studies of the project area including the Emerald Necklace Master Plan, and flood control studies by the Army Corps of Engineers (USACE), the Executive Office of Environmental Affairs (EOEA), and the Federal Emergency Management Agency (FEMA).

Stakeholders

Stakeholders with a common interest in restoring the Muddy River include: Boston Parks and Recreation Department (which serves as the lead agency), the Town of Brookline (which together with Boston is a project proponent), the Massachusetts Department of Conservation and Recreation - DCR (formerly the Department of Environmental Management and the Metropolitan District Commission), and the Boston Water and Sewer Commission. Several other agencies and entities also have actively supported the project, including the USACE and EOEA, among others. Many non-profit environmental groups, neighborhood groups and individual citizens have worked in cooperation on the project as well. A Citizens Advisory Committee (CAC) was established to provide input to the project and has been active in reviewing and commenting on project submittals in advance of finalization. A Maintenance and

Management Oversight Committee (MMOC) was also established as an independent oversight body.

Project Location

The project area, shown in Figure ES-1, is within the Muddy River watershed, beginning with the Muddy River confluence with the Charles River, and extending 3.5 miles upstream to Ward's Pond and including:

- The Charlesgate area (Boylston Street to the Charles River);
- The Back Bay Fens (The Riverway at the former Sears Parking Lot to Boylston Street);
- The Riverway (The Riverway at the former Sears Parking Lot to Leverett Pond);
- Leverett Pond;
- Willow Pond; and
- Ward's Pond.

Improvements in the Charlesgate area were previously reviewed and approved by the regulatory authorities and construction in this area is complete. Therefore, this document focuses on the remaining Phase I work – from the Back Bay Fens extending upstream to Ward's Pond.

The Supplemental Final Environmental Impact Report

This report is the Supplemental Final Environmental Impact Report (SFEIR) for the Phase I project. The SFEIR responds to issues raised by the Secretary of Environmental Affairs and commenters on the Final EIR (FEIR), which was filed with the Massachusetts Environmental Policy Act (MEPA) office in February 2003.

The Certificate on the FEIR, issued on May 1, 2003, required an SFEIR to provide additional information on alternatives, impacts, and mitigation, while reiterating EOEA's commitment to the "successful implementation of this important public project."

It is important to note that, since the issuance of the FEIR Certificate, there have been meetings with MEPA and other agencies (including the Department of Environmental Protection, or DEP, and USACE), to advance project planning and resolve outstanding issues (including many issues from the FEIR Certificate and comment letters). This SFEIR reflects the results of those discussions. These agencies participated in a review process with subcommittees made up of the proponents, CAC and MMOC members, and other volunteers with special expertise in the areas noted in the Secretary's May 2003 Certificate.

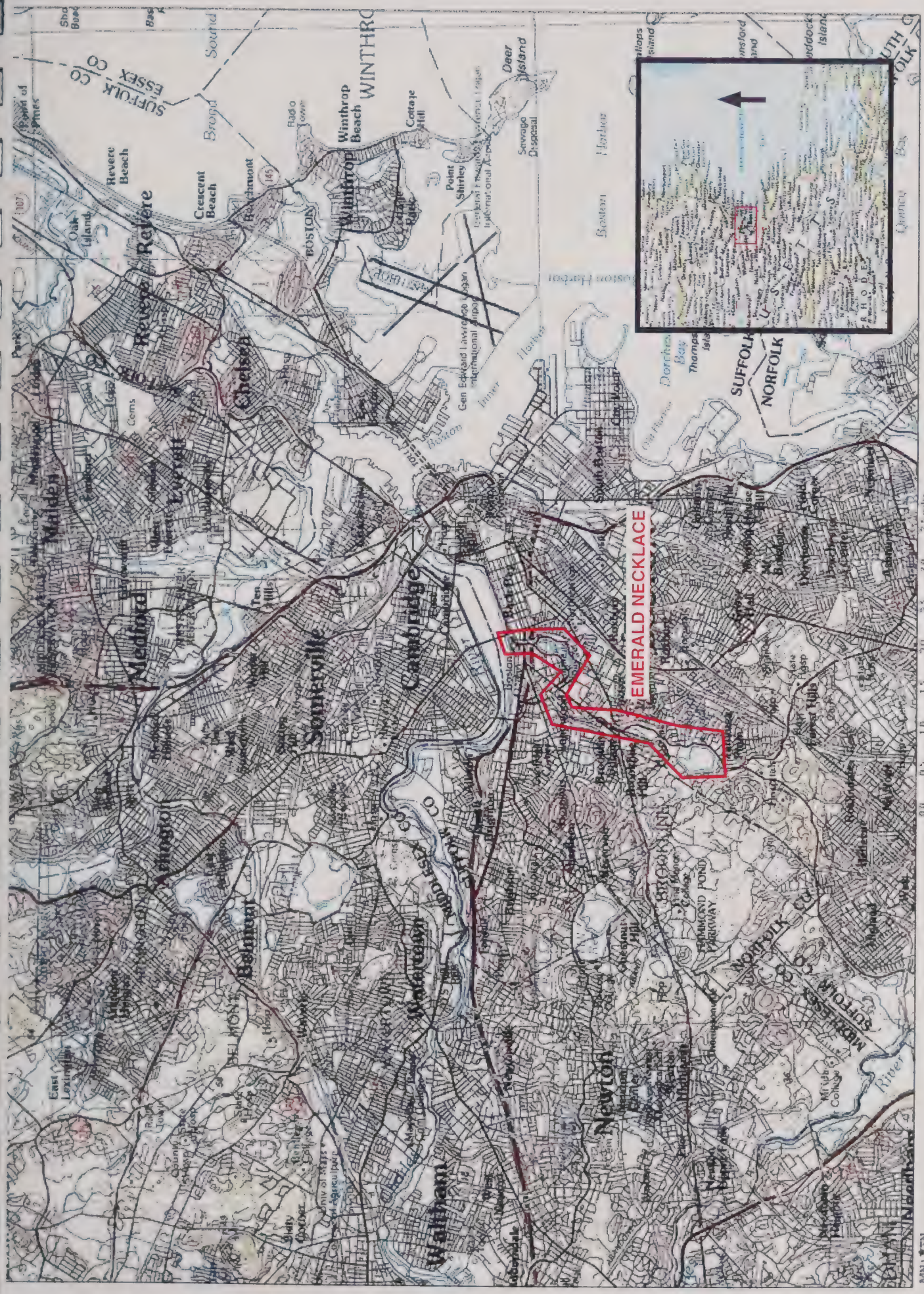


Figure ES-1
Site Location

Map created with TOPOL® ©2002 National Geographic (www.nationalgeographic.com/topo)

Project Objectives

The project is designed to meet a number of objectives. Each objective is included to address specific problems that have developed over time and/or to maximize the benefits to be derived from the proposed improvements. The following summarizes the problems to be addressed.

Provide Flood Control. In October 1996, the Muddy River flooded as a result of a storm that deposited 5.45 inches of rain in a period of 24 hours, and incurred damages estimated at \$63M for the Muddy River, the MBTA and Stony Brook Conduit. (Damage estimate provided by the USACE for public damages. FEMA reported alternative avoided damages between \$74 and \$117 million including public and private damage.) Analyses conducted subsequently show that the 1996 storm flows overwhelmed the Muddy River capacity as a result of the increase in impervious area within the watershed over time, and constrictions in flow capacity caused by inadequate culvert sizes where the Muddy River has been culverted under the former Sears parking lot and at the Fens Bridge. The encroachment of invasive species and the deposition of sediment have also reduced the flood-carrying capacity in certain sections of the channel. The project will improve flood control by increasing culvert capacity and removing flow restrictions in the waterway.

Improve Water Quality. Urban runoff and storm drain discharges have resulted in sedimentation, increased turbidity, and contaminants both in the water column and in river sediments. A reduction in dissolved oxygen has also resulted. These discharges have contributed to the water quality degradation experienced along some portions of the Muddy River. Removing contaminated and organically enriched sediments, stabilizing banks where needed, and implementing other measures (such as instituting Best Management Practices, or BMPs), are intended to address the water quality problem in the Muddy River.

Enhance Aquatic and Riparian Habitat. Much of the sediment in the river is contaminated with compounds typically found in urban environments (e.g., metals). Removal will result in improved aquatic habitat. Rehabilitating historic islands will also improve the aquatic and riparian habitat. In addition, the replanting plan for disturbed riparian areas entails providing a diverse habitat and where appropriate, replacing invasive species that have overtaken certain areas with a variety of plantings to provide improved wildlife habitat.

Institute Best Management Practices in the Muddy River System. Since 1898, portions of the Muddy River have been dredged approximately every 30 years as a result of cyclical sedimentation accumulation. The implementation of BMPs is intended to maximize the life span of the improvements for the other project objectives, i.e., flood control, water quality, habitat enhancement, and historic resources. BMPs will be an integral component of the overall plan to protect the public's investment in this valuable resource.

Restore Landscape and Historic Resources. The distinctively designed landscape of the Emerald Necklace Parks has declined due to inattention and the vanishing of many species that were an integral part of the parks. Significant areas have been overtaken by invasive species, including Phragmites and Japanese knotweed. The project will rehabilitate and preserve the historic resource.

Proposed Activities

Each of the improvements discussed in this report is associated with one or more of the following activities: dredging, infrastructure improvements, wetlands restoration/bank stabilization, historic landscape rehabilitation, and/or BMPs.

Dredging and Infrastructure Improvements

Flood carrying capacity of the Muddy River will be improved and historic capacities of Leverett, Willow and Ward's Ponds will be restored via dredging and removal of accumulated sediment. Construction activities will include dredging, proper management of dredged material, removal of invasive species (such as Phragmites), refilling of shoreline areas, and final regrading to historic shoreline configurations.

Proposed infrastructure improvements include culvert replacements/daylighting, and some improvements to roadway storm drain systems.

Wetlands Restoration/Bank Stabilization

Restoring a more diverse plant community along the banks of the river and ponds will involve alteration of the banks in areas to re-grade contours and remove existing vegetation that is inconsistent with the Olmsted plan. In order to create a healthy and viable wetland environment, the full Olmsted plant list will not be used, but will guide the planting program. Once dredging is completed in each area, the banks will be replanted to create a diverse plant community along the shoreline. This will improve habitat capacity compared to existing conditions and serve to stabilize banks. In addition to restoration of existing degraded wetlands, replication or replacement wetlands will be established in selected upland areas.

The work in wetlands, including dredging, is proposed as a limited project, pursuant to the Massachusetts Wetlands Protection Act (310 CMR 10.53(4)), which allows projects to proceed that "will improve the natural capacity of a resource area(s) to protect the interests" of the Act.

Historic Landscape Improvements

Rehabilitation of Olmsted's historic park system will require a balance of engineering solutions and landscape design. The following actions are necessary, either individually or in combination:

- Remove invasive vegetation;
- Protect historic resources from damage due to construction;

- Preserve and rehabilitate the historic river bank configuration along the Muddy River, including rehabilitation of the historic islands; and
- Plant vegetation in keeping with the historic landscape design, guided by the Emerald Necklace Master Plan.

Best Management Practices

The project also includes watershed-wide BMPs. The goal of the BMP plan for the watershed is to reduce solids loading in the river by 30 percent. This is a broad commitment that applies to the entire watershed, rather than limiting the program to the construction area. The proposed BMPs include source control BMPs -- street sweeping, construction site controls, catch basin cleaning, and cleaning and improvements to the Stony Brook conduit. Proposed structural BMPs are composed primarily of particle separators but also include bioretention areas, sand filters, and swales.

Activities by Area

Specific activities comprising the project in each of the geographic areas (The Back Bay Fens area, The Riverway, Leverett Pond, Willow Pond, and Ward's Pond) are outlined below:

- Back Bay Fens: daylighting culverts at the Fens Bridge and former Sears parking lot to restore the Olmsted-designed shoreline; dredging to remove 95,500 cubic yards (cy) of sediment and debris, and 23,500 cy of Phragmites; installing new arch culverts under the Riverway and Brookline Avenue; improvements to roadway storm drain systems; and bank and landscape rehabilitation.
- The Riverway: dredging to remove 20,200 cy of sediment and debris, and 10,000 cy of Phragmites; improvements to roadway storm drain systems; and bank and landscape rehabilitation.
- Leverett Pond: dredging to remove 23,900 cy of sediment and debris; and bank, island, and landscape rehabilitation.
- Willow Pond: dredging to remove 5,900 cy of sediment and debris; and bank and landscape rehabilitation.
- Ward's Pond: dredging to remove 15,600 cy of sediment and debris; and bank and landscape rehabilitation.

Balancing Project Benefits and Impacts

The primary impacts associated with the project are beneficial, including critically needed improvements in flood control infrastructure, rehabilitation of one of the world's great works of landscape architecture, along with improvements in water quality and wildlife habitat. However, the proposed rehabilitation will result in the

temporary disturbance of the Muddy River, public use of portions of the parklands, roadways, and pedestrian walkways. Short-term impacts during the construction period, and proposed mitigation measures, include the following:

- Temporary water quality impacts from the staging area, from dredge and debris removal locations, and from the return water. Among the measures to mitigate these impacts are the following: return water will be treated prior to discharge, areas to be dredged will be enclosed by silt curtains, and water quality will be monitored.
- Temporary impacts to vegetation at the staging areas and adjacent to the river. Trees to be retained will be protected from damage. However, no net loss of wetlands will result, as specific resource areas will be enhanced through wetland restoration and replication.
- Temporary impact to the limited aquatic and wildlife resources. However, the ultimate result of the project will be enhanced habitat, including the habitat of a state-threatened fish species, the Threespine Stickleback.
- Temporary impact on recreational use and pedestrian access. Again, temporary disturbances during construction will be balanced by the improvements as a result of project implementation.

The mechanisms to ensure that construction-related impacts are adequately mitigated include the following (note that the USACE mitigation commitments may differ but are expected to meet the same intent):

- Contract documents will include specifications or requirements that the contractor must meet to reduce environmental impacts; and
- The contractor will prepare plans for approval describing how work will be conducted, including:
 - Dredged Material Plan
 - Stormwater/Dewatering Pollution Prevention Plan
 - Environmental Monitoring and Sampling Plan
 - Plan for Monitoring of Wetland, Shoreline and Landscape Restoration
 - Pest Control Plan
 - Traffic Management Plan
 - Transportation and Disposal Plan
 - Plan for Monitoring of the Three-Spine Stickleback
 - Public Outreach Program

A Resident Engineer and an Independent Environmental Monitor (IEM) will monitor compliance with the contract documents and contractor's submitted plans. The IEM will be part of the proponent's construction monitoring team, but will not be responsible for the construction contract's commercial terms. The IEM will report violations of the mitigation measures and environmental permits to the construction management team.

Protecting the Investment

Phase I implementation will require nearly \$100 million from federal, state, local and private sources. To ensure that this significant monetary investment is protected for the future, a management structure and Maintenance and Management Plan have been developed.

Management Structure

The Muddy River project area is managed by Boston Parks and Recreation Department, Town of Brookline Parks and Open Space Division, and the DCR.

In 1999, the City of Boston and Town of Brookline signed a Memorandum of Agreement (MOA) detailing the financial and management terms for conducting the project. The MOA identified the responsibilities for Boston and Brookline in contracting for services and sharing information on the project. There was no specific definition of the level of funding required by either party or source of other funds.

Also signed in 1999 was a Memorandum of Understanding (MOU) containing the responsibilities for funding and administering the project. In summary, the MOU identified the City of Boston through its Parks and Recreation Department as the project manager of Phase I of the project. The City receives and disburses funds for the project in cooperation with other participating agencies. The proponents agreed to accept responsibility for costs of maintaining and managing the project, including implementation of BMPs once Phase I is complete.

The proponents are working with the MMOC, ENC and DCR to develop an MOA for an innovative, cooperative model for management. A draft of the structure has been provided by EOE and is included in the SFEIR with signatories' comments. The MOA creates a "Cabinet" including all three property managers (Boston, Brookline and DCR), the nonprofit organization dedication to the protection and enhancement of the Olmsted-designed Emerald Necklace Parks (the Emerald Necklace Conservancy) and the MMOC.

The Challenge: Ongoing Management and Maintenance

The Muddy River Phase I project presents a unique challenge because it involves work in three jurisdictions with separate resources and funding commitments. The parks and the river form part of the boundary between Boston and Brookline. Despite the physical boundary of the waterway, many voices have expressed a desire for a "seamless" park system. Park users should be able to enjoy the parks without

distraction, moving freely and with pleasure from city to town, path to bridge, woodland to overlook, experiencing the diversity of spaces Olmsted envisioned.

The proponents addressed the vision of “seamlessness” by developing a management and maintenance system that will ensure cooperation and consistency. The management model will not, however, diminish the role of regulatory bodies or those committees formed in the regulatory process.

Parkland Maintenance Plan

Parkland maintenance falls under the responsibility of Boston Parks and Recreation, Brookline Parks and Open Space and the DCR. These agencies provide dedicated work crews for specific areas to ensure continuity in carrying out maintenance activities.

The Maintenance and Management Plan provides standards for maintenance of the project area after Phase I is constructed. The plan was developed with the assistance of the DCR Historic Resources staff, the ENC, Arnold Arboretum staff and other skilled volunteers. The plan is based upon the understanding of the historic significance of the property, its role as a significant component of the stormwater infrastructure, and its value as a well-used and well-loved urban park system. The plan provides details on the landscape, appropriate maintenance procedures and programs. It provides important visual tools for staff and volunteers and sets a high, but appropriate, standard for care.

Monitoring and Maintenance to Ensure Effectiveness

Beyond general parkland maintenance activities, the long-term success of the Phase I improvements depends on the ongoing monitoring of project successes and needs, and corresponding maintenance to ensure that structural and non-structural elements are contributing to the goals of the project.

Culverts and Best Management Practices

As new culverts are constructed under this project, monitoring and maintenance will be required to ensure that the facilities operate at full capacity to pass storm flows.

Once new BMPs are implemented and existing BMPs are improved, a monitoring and maintenance plan will be followed to evaluate and ensure the effectiveness of the BMPs and to reduce the need for future capital expenditures. For new structural BMPs, maintenance involves inspection and cleaning at regular intervals. If proper maintenance is carried through, the project life of the new systems will be maximized.

Corrective and Maintenance Measures Following Storm Events

The maintenance plan also includes preventative, corrective and emergency actions to be conducted before, during, and following a storm event of a specific magnitude.

Pest and Rodent Control

This portion of the maintenance plan addresses the control of geese, as well as control of rodents.

Water Quality Monitoring

Long-term monitoring of water quality will occur at designated locations to gage water quality as related to meeting DEP Class B waters and also progress towards reducing sediment loads on the river basin.

Observations on the Growth and Success of Plantings

The project proponents will inspect the wetland and other habitat plantings to assess the success of the effort and to re-evaluate and adjust planting efforts as required. The success of efforts to control invasive species currently overgrowing the river will also be monitored.

Monitoring of Fish and Wildlife Distribution and Reproduction

Changes in distribution and species composition of fish and wildlife will be monitored to determine the extent of improvement. This information will also add to the scientific database on the Muddy River.

Monitoring and Maintenance of Historic and Character Defining Features

One requirement of the project is that the proponents maintain the historic and character-defining features of the restored parks. To fulfill this requirement, the proponents will develop a report on annual site inspections to assess the condition of these features and to re-evaluate and adjust maintenance efforts as required.

Reporting and Accountability Beyond Project Construction

The longevity of the project is dependent on the monitoring and maintenance described above, which must be regularly documented and reviewed for consistency with project goals. There will be a number of reporting mechanisms in place after construction for ongoing monitoring and reporting. These plans, procedures and reports will document project successes and needs relative to the monitoring and maintenance activities summarized above.

The City of Boston, Town of Brookline and the DCR, to the extent defined in the new MOA and MOU, will share responsibility for implementing the long-term maintenance requirements and providing necessary documentation, assisted by the other Cabinet members. In addition, the proponents and Commonwealth of Massachusetts have agreed to provide funds to the MMOC for their use in performing their oversight responsibilities.

The MEPA Annual Update

Annual updates to the MEPA office are required for all phases of this project. The updates will be filed yearly as a means of informing the Secretary of Environmental

Affairs and the public of progress on project implementation, monitoring and effectiveness of mitigation and replanting.

Environmental Permits and Approvals For Maintenance

Many of the approvals and permits to be obtained from federal, state, and local regulatory authorities will contain requirements for ongoing monitoring and reporting.

Report and Logs – Quality Assurance

A series of logs or monitoring reports will be prepared at appropriate intervals to document that the project is accomplishing its goals. These reports include maintenance logs for park staff, as well as reporting on water quality, BMP maintenance, plantings, fisheries and wildlife, and condition of historic features, as previously outlined.

Project Costs, Funding and Schedule

The estimated capital cost of project construction (for Phase I, excluding Charlesgate) is roughly \$89 million. This cost includes design and construction of the various project elements, including capital costs for the treatment control or structural BMPs in the watershed.

A funding strategy for the capital costs has been formulated involving contributions from federal, state, and municipal sources. The USACE has been authorized by the Congress in the Water Resources Development Act of 2000 (WRDA2000) to undertake the Muddy River project for flood damage reduction and environmental restoration. Also, the Commonwealth of Massachusetts has committed to provide significant capital funding (included in Environmental Bond Bill of 2002). The municipalities of Boston and Brookline, having partnered with the state and federal agencies in funding the first \$7 million, are committed to obtaining capital funds to supplement the federal and state sources. The City and Town, as co-proponents, have also agreed to accept responsibility for costs of maintaining and managing the project, including BMPs, once Phase I construction is complete.

Final design of Phase I (Back Bay Fens to Ward's Pond) is expected to begin in 2005, with construction commencing in 2006.

1

Section One

Section 1

Introduction

1.1 Background

This report is the Supplemental Final Environmental Impact Report (SFEIR) for the Phase I Muddy River Flood Control, Water Quality and Wildlife Enhancement, and Historic Preservation Project ("the project"). The SFEIR responds to issues raised by the Secretary of Environmental Affairs and commenters on the FEIR, which was filed on March 18, 2003. The project proponents (City of Boston and Town of Brookline) request the Secretary's approval of the locally preferred plan described in this document.

The project involves a multidisciplinary approach to improving the Muddy River system, adjacent parkland, and other areas that are part of what is referred to as the Emerald Necklace, located in Boston and Brookline, Massachusetts. Components of the project are derived from previous engineering and historical studies of the project area including the Emerald Necklace Parks Master Plan ("the Master Plan") by the City of Boston and Town of Brookline, and flood control studies by the U.S. Army Corp of Engineers (USACE), the Executive Office of Environmental Affairs (EOEA), and the Federal Emergency Management Agency (FEMA).

Stakeholders with a common interest in restoring the Muddy River include Boston Parks and Recreation Department (which serves as the lead agency), the Town of Brookline, the Massachusetts Department of Conservation and Recreation (formerly the Department of Environmental Management and the Metropolitan District Commission), and the Boston Water and Sewer Commission. Several other agencies and entities also have actively supported the project, including The Emerald Necklace Conservancy (ENC), the USACE, EOEA, FEMA, the Department of Federal Housing and Urban Development (HUD), and the Massachusetts Emergency Management Agency (MEMA). Many non-profit environmental groups, neighborhood groups and individual citizens have worked in cooperation on the project as well.

Diverse project advocates and supporters need to build consensus and coordinate their efforts for a project such as this to be successful. By using a public process that includes a Technical Advisory Group (TAG) (consisting of federal, state and local personnel), a Pre-Application Review Committee made up of regulators and a Citizens Advisory Committee (CAC) (appointed by Secretary of the Executive Office of Environmental Affairs), all stakeholders have contributed, and will continue to contribute, to the project. Additional public outreach through public information meetings and speaking opportunities will continue to broaden project input. Lastly, the organization of the ENC and the Maintenance and Management Oversight Committee (MMOC) provides the structure through which the private sector can support the project.

The project area, located in Boston and in Brookline, is surrounded by a variety of land uses including historic parkways designed for pleasure vehicle use, educational

and art institutions, medical facilities, residential development, and more. The Emerald Necklace Master Plan covered the park network from Back Bay to Franklin Park. The Phase I Muddy River Flood Control, Water Quality and Wildlife Enhancement and Historic Preservation Project covers a portion of the Muddy River watershed, beginning with the river's confluence with the Charles River, and extending 3.5 miles upstream to Ward's Pond (see Figure 1-1). The project area includes:

- The Charlesgate area (Boylston Street to the Charles River);
- The Back Bay Fens (The Riverway at the former Sears Parking Lot to Boylston Street);
- The Riverway (The Riverway at the former Sears Parking Lot to Leverett Pond);
- Leverett Pond;
- Willow Pond; and
- Ward's Pond.

1.2 Project Purpose and Need

1.2.1 Development Impacts on the Emerald Necklace

The Emerald Necklace Park system is composed of a series of parklands and historic pleasure vehicular parkways. A significant number of parks are linked by the elements of the Muddy River system: The Back Bay Fens, The Riverway, Leverett Pond, Willow Pond, Ward's Pond, and Jamaica Pond. All of these parks, and their water bodies and wetlands, are central features of the Emerald Necklace System. This system of integrated parks and parkways, designed by the country's most famous landscape architect, Frederick Law Olmsted, and his associates during the last two decades of the nineteenth century, has great historical significance as his most ambitious undertaking involving landscape architecture, metropolitan planning and engineering. In particular, Olmsted transformed the Back Bay Fens and Riverway sections, creating entirely new landscapes by dredging and filling, supplemented by nearly complete revegetation in order to create new and original scenery. He also employed the civil and sanitary engineering needed to make the watercourses functional and protected against flooding. Into these spaces he introduced a complex system of walks, bridle paths, and carriage drives to facilitate movement through the city and to provide for recreational enjoyment of the scenery.

Since its creation around the turn of the twentieth century, the Emerald Necklace in general, and the area surrounding the Muddy River in particular, has been subject to the effects of gradual yet extensive urbanization. As the populations of Boston and Brookline grew, they brought with them the attendant expansion of buildings, roadways, traffic, and congestion. The results of development on the watershed have

Figure 1-1 Site Locus

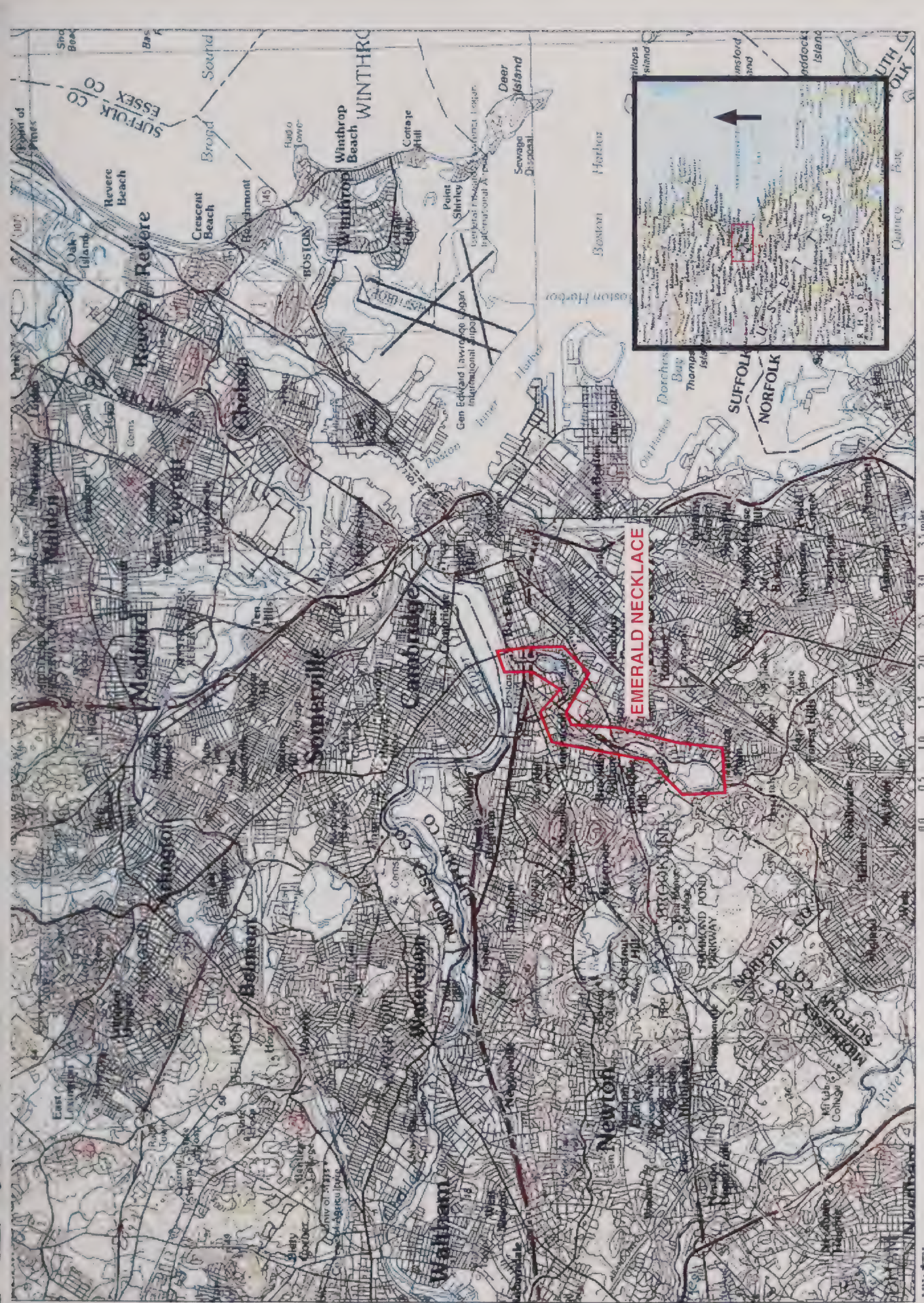


Figure 1-1
Site Location

Map created with TOPO!® ©2002 National Geographic (www.nationalgeographic.com/topo)

been significant. Flooding has worsened because there is little natural storage left in the widely paved watershed, and sediment and debris have washed into the river, choking off flood carrying capacity. Water quality has deteriorated as an array of natural and man-made compounds are carried off the land surface during rainstorms and deposited into the river. The construction of the Charles River Dam in 1805-6 forever altered the ecosystem and hydrologic design of the Emerald Necklace, changing a tidal estuary into a low gradient freshwater stream. Non-native invasive species of flora such as *Phragmites* and Japanese knotweed have overtaken portions of the river, pushing out native species, creating safety hazards, eliminating natural habitats and greatly limiting the diversity of wildlife that can live within the watershed. The distinctive landscape designed by Frederick Law Olmsted has declined in richness and diversity, the present landscape lacking the subtlety and coherent massing of plant materials that once characterized the original landscape.

1.2.2 Project Objectives

As shown in Figure 1-2, Project Objectives, the project is designed to meet a number of objectives. Each objective is included to address specific problems that have developed over time and/or to maximize the benefits to be derived from the proposed improvements. The following summarizes the problems to be addressed.

Provide Flood Control. In October 1996, the Muddy River flooded as a result of a storm that deposited 5.45 inches of rain in a period of 24 hours, and incurred damages estimated at \$63M for the Muddy River, the MBTA and Stony Brook Conduit. (Damage estimate provided by the USACE for public damages. FEMA reported alternative avoided damages between \$74 and \$117 million including public and private damage.) Analyses conducted subsequently show that the 1996 storm flows overwhelmed the Muddy River capacity as a result of the increase in impervious area within the watershed over time, and constrictions in flow capacity caused by inadequate culvert sizes where the Muddy River has been culverted under the former Sears parking lot and at the Fens Bridge. The encroachment of invasive species and the deposition of sediment also have reduced the flood-carrying capacity in certain sections of the channel. The project will improve flood control by increasing culvert capacity and removing flow restrictions in the waterway.

Improve Water Quality. Urban runoff and storm drain discharges have resulted in sedimentation, a reduction in dissolved oxygen, increased turbidity, and contaminants in both the water column and in river sediments. These discharges have contributed to the water quality degradation experienced along some portions of the Muddy River. Removing contaminated and organically enriched sediments, stabilizing banks where needed, and implementing other measures (such as Best Management Practices, or BMPs), are intended to address the water quality problem in the Muddy River.

Enhance Aquatic and Riparian Habitat. Much of the sediment in the river is contaminated with compounds typically found in urban environments (e.g., metals). Removal will result in improved aquatic habitat. Reconstructing or replanting historic islands will also improve the aquatic and riparian habitat. In addition, the replanting

plan for disturbed riparian areas entails providing a diverse habitat and where appropriate, replacing invasive species that have overtaken certain areas with a variety of plantings to provide improved wildlife habitat.

Institute Best Management Practices in the Muddy River System. Since 1898, portions of the Muddy River have been dredged approximately every 30 years as a result of cyclical sedimentation accumulation. The implementation of BMPs is intended to maximize the life span of the improvements for the other project objectives, i.e., flood control, water quality, habitat enhancement, and historic resources. BMPs will be an integral component of the overall plan to protect the public's investment in this valuable resource.

Restore Landscape and Historic Resources. The distinctively designed landscape of the Emerald Necklace Parks has declined due to inattention and the vanishing of many species that were an integral part of the parks. Significant areas have been overtaken by invasive species, including *Phragmites* and Japanese knotweed. In order to rehabilitate and preserve the historic landscape and historic resources, the following actions are necessary, either individually or in combination:

- Remove invasive vegetation;
- Protect historic resources from damage due to construction;
- Preserve and rehabilitate the historic river bank configuration along the Muddy River, including restoration of the historic islands; and
- Plant vegetation in keeping with the historic landscape design, guided by the Emerald Necklace Master Plan.

The implementation and accomplishment of these actions will meet this project objective and will increase vegetative, structural, and wildlife diversity substantially.

1.3 Description of the Preferred Alternative

1.3.1 Phase I of the Emerald Necklace Environmental Improvements Master Plan

The project, as described herein, comprises Phase I of the 1999 Emerald Necklace Environmental Improvements Master Plan, and is consistent with the overall Emerald Necklace Parks Master Plan, which was prepared in 1989 by Walmsley, Pressley Joint Venture and updated in 2001 by Pressley Associates Inc. The overall Master Plan represents a plan for the preservation and long range management of the four parks that constitute the Muddy River chain of parks of the Emerald Necklace—Jamaica Pond, Olmsted Park, The Riverway and the Back Bay Fens -- designed by Frederick Law Olmsted in the period from 1878 to 1895.



Each of the improvements discussed in this report can be categorized as being associated with dredging, infrastructure improvements, BMPs, wetlands restoration/bank stabilization, and historic landscape improvements. Dredging, infrastructure improvements and BMPs are proposed primarily as flood control and water quality improvement measures. Project elements falling into the other of these categories are intended to ensure the long-term effectiveness of the flood control and water quality improvement measures and to preserve the historic integrity of the Emerald Necklace.

The timing and duration of the project elements will be determined by funding availability and environmental constraints. However, as previously proposed in the ENF and the Emerald Necklace Environmental Improvements Master Plan, a general phasing plan consists of the following:

- Phase I - Muddy River Dredging, Flood Control, Water Quality Improvements, Aquatic/Riparian Habitat Enhancement, Historic Restoration, and Best Management Practices
- Phase II - Historic Landscape Improvements, Revegetation, Traffic Circulation Improvements, Building and Bridge Restoration.
- Phase III - Traffic Circulation Improvements, Building and Bridge Restoration.
- Phase IV - Jamaica Pond, Arnold Arboretum, Scarborough Pond, etc.

This SFEIR focuses primarily on Phase I project elements (and specifically Phase IB as described below), while it also addresses a process for review of subsequent phases. The Phase I elements have been further divided into:

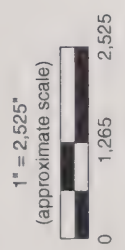
- IA- Charlesgate Area (Boylston Street to Charles River)
- IB- Muddy River (Ward's Pond to Ipswich Street, which includes The Back Bay Fens Area, The Riverway, and The Olmsted Park - i.e., Leverett Pond, Willow Pond, and Ward's Pond).

Sections of Phase I of the Muddy River Project are depicted in Figure 1-3. Implementation of elements within these geographic sections of the project will occur subsequent to the approval of the SFEIR, with the exception of Charlesgate improvements. Authorization has been obtained for Charlesgate activities to proceed in advance of this SFEIR and they are now complete. Elements not identified as part of Phase I will proceed based on funding availability, regulatory approvals and submission of an impact assessment in the Massachusetts Environmental Policy Act (MEPA) Annual Update.

Phase I implementation involves riverbank stabilization, replanting wetlands and making landscape improvements in concert with of flood control and other structural improvements. All landscape improvements, (e.g. lawn plantings, specimen tree and shrub plantings) and improvements to buildings/light fixtures etc., will be performed after all heavy equipment has been removed from the site(s), thereby offsetting any resultant damage during the construction process.



Figure 1-3
Phase 1 Project Area
 Source: CDM



1.3.2 Preferred Alternative Activities

The recommended plan consists primarily of the following:

- Flood control improvements to protect against a flood with return frequency of 20 years;
- Daylighting two sections (700 lf) of the Muddy River;
- Dredging of the Fens, Riverway, and Leverett, Willow and Ward's Ponds;
- Eradication of *Phragmites* from wetland and riparian areas by dredging and cutting-herbicide treatment; and
- Restoration of historic plantings along the wetland and riparian areas of the project.

A more detailed description of each of these activities is presented below.

The components of the recommended plan include those that serve a flood control function only, those that provide environmental restoration, and those that provide both. The USACE has also prepared an Environmental Assessment of the project for the purpose of determining participation in funding and construction of eligible components.

There are some differences between the preferred alternative as proposed by the USACE and that proposed by the local sponsors. Principal objectives of the proposed USACE project include flood damage reduction and restoration of aquatic and riparian habitat (environmental restoration). Local sponsors (project proponents) are also very interested in restoring the historic landscape and other cultural resources within the Emerald Necklace park system. Therefore, the "locally preferred plan" includes more historic plantings (from the original Olmsted plant list) than the USACE plan. Note also, that the monitoring and mitigation measures described herein are associated with the locally preferred plan, although the USACE plan would also meet the intent of these measures.

The following presents each project feature and its purpose.

- Dredging the Fens to historic 1920s limits will include the dredging necessary for flood conveyance and additional dredging for environmental restoration. Within the Fens, about 80,000 cubic yards (cy) of sediment and debris will be removed, with an allowance of 15,500 cy of dredging for deepened channel sections. About 23,500 cy of *Phragmites* will also be removed.
- Within the upper Fens area, two sections of Muddy River would be daylighted. The first is a section about 360 feet long situated upstream of the culvert under Avenue Louis Pasteur. The second is a section about 330 feet long at the former Sears parking lot. In both areas, existing twin six-foot diameter culverts would be removed. Although all costs for these features are allocated to flood control, opening up these sections of river will provide considerable environmental and

historic restoration benefits. Daylighted sections will be restored to approximate 1920 contours. Embankments will be planted with appropriate trees and shrubs.

- The existing culverts under Brookline Avenue will be replaced with a 10 x 24-foot arched culvert about 330 feet long. Included with this culvert is an overflow connection to the underground gatehouse at the entrance to the Muddy River Conduit. These improvements are required for flood conveyance.
- The existing twin 6-foot diameter culverts under the rotary and access roads at the downstream end of the Riverway will remain and be supplemented with a 10 x 16-foot arched culvert. This new culvert is required for flood control.
- Removing about 18,500 cy of accumulated sediment and debris from the Riverway, with an allowance for 1,700 cy of dredging for deepened channel sections. Approximately 10,000 cy of *Phragmites* will also be removed.
- Under the locally preferred plan, dredging of Leverett Pond consists of the removal of nearly 21,800 cy of accumulated sediment (approximately 2 foot depth) and an allowance of 2,100 cy of dredging for deepened channel sections. Under the USACE plan, approximately 29,000 cy of material (approximately 4 foot depth) would be removed.
- Dredging of about 5,000 cubic yards of sediment at Willow Pond and about 16,000 cubic yards at Ward's Pond for environmental restoration purposes, with an allowance of about 840 cy of dredging for deepened channel sections. The USACE plan will limit funding on the Ward's Pond portion.
- Eradication of *Phragmites* from the Fens and Riverway through dredging and cutting/herbicide application.
- Restoration of wetland vegetation in dredged areas by planting appropriate emergent wetland plants in selected areas in the Fens, and along the Fens, Riverway, Leverett Pond, and Willow Pond shoreline. Approximately 3.5 acres of emergent vegetation will be planted.
- Restoration of riparian vegetation in upland areas where *Phragmites* is eradicated by planting trees and shrubs. The USACE plan restores less area with riparian vegetation.
- Restoration of vegetation and other landscape features disturbed at staging areas.
- Installation of boulders in the Fens, Riverway, and Leverett Pond to improve fisheries habitat. Approximately 100 boulders or boulder clusters will be installed.
- Installation of 10 in-stream deflectors in the Riverway to create scour holes to diversify aquatic habitat.
- Installation of 25 - 50 habitat logs to restore lost basking sites for turtles and amphibians in dredged areas.

- Under the locally preferred plan, restoration of Babbling Brook between Willow and Leverett Ponds.
- Under the locally preferred plan, removal of sediment and erosion control at Spring Pond to restore and protect the Threespine Stickleback habitat.

1.4 Summary of Impacts and Mitigation Measures

1.4.1 Introduction

The primary impacts associated with the project are beneficial, including critically needed improvements in flood control infrastructure, rehabilitation of one of the world's great works of landscape architecture, along with improvements in water quality and wildlife habitat. However, the proposed rehabilitation will result in the temporary disturbance of the Muddy River, public use of portions of the parklands, roadways, and pedestrian walkways. Specifically, staging areas for dredging and other activities will contain some combination of sedimentation tanks, pumps, coagulant polymer feed systems, belt filter presses, water filters, conveyor belts for truck loading, a field office, and/or limited construction parking. The former Sears parking lot will further be the site of construction activities related to construction of an arch culvert under The Riverway and Brookline Avenue. Long-term physical alterations will occur at the Fens Bridge and former Sears parking lot, where culverted sections are restored to more natural ecosystems and historic configurations.

When staging areas are expected to be reused during later construction activities, the restoration will initially be a temporary plan. The site will be stabilized with erosion control materials and seeded if the site will be unused for a growing season. Once the staging area use is completed, the final restoration will be completed.

Specific impacts related to project implementation are summarized below.

1.4.2 Sediment Quantity and Quality

The proposed project will remove about 200,000 cubic yards of sediment from the Muddy River. Depth of material removed ranges from 2 to 4 feet in most areas and 6 feet in Willow Pond. Following dredging, sediment will gradually begin to re-accumulate as a result of loading of inorganic or organic matter from storm drains and non-point runoff, organic matter from riparian and wetland vegetation and organic matter produced by algae and aquatic plants. With best management practices in place, sediment depths will not reach existing depths for at least 50 years in Leverett Pond and the Riverway. In the Back Bay Fens, existing depths may be reached within 30 years.

Muddy River sediment consists of organic silt, fine-to-coarse sand, and gravel. At various locations along the river the sediment also contains decayed plant matter, sticks, peat, bricks, wood glass, and pieces of concrete. Sediments in the river are also documented to contain elevated levels of metals, PAHs, and petroleum hydrocarbons, with PCBs and DDT (and its metabolites) also found frequently. The USACE analyzed sediment contamination and concluded that contaminant concentrations are

higher in surface sediment and decline with depth (USACE, 2002). Accumulated sediments will be removed to depths ranging from one to five feet. Sediment oxygen demand is expected to be substantially reduced by dredging. Contaminated sediments will be handled according to state and federal laws and regulations. This removal will increase river flow capacity and improve overall sediment quality.

1.4.3 Water Quality

Long-term benefits to water quality will greatly outweigh short-term impacts to water quality from construction activities. Runoff from the staging areas, dredging operations, and return water from the belt filter presses will increase turbidity in the river. The durations will be short, and due to the extremely low flow volume of the Muddy River, the area affected will be limited. The return water will be treated so that total suspended solids (TSS) are less than 40 mg/l and the dissolved oxygen level is at least 5 mg/l.

1.4.4 Benthic Resources

Dredging will result in a temporary loss of benthic species (e.g., worms, midges and other invertebrates), which are presently dominated by pollution-tolerant organisms. Since dredging will occur over several years, the entire area will not be dredged at once and recolonization from undisturbed areas will occur. Recruitment from areas that will not be dredged will also occur. These remaining benthic species are expected to act as seed for regrowth. However, the new community is likely to be less dominated by pollution-tolerant organisms as clean water benthic species begin to proliferate. Improved sediment quality following dredging should result in a more diverse and productive benthic community at Willow Pond, Leverett Pond, the Riverway, and Back Bay Fens.

1.4.5 Fish Resources

It is anticipated that dredging will kill some fish (although no dredging will occur during the spring fish migratory period between March 1 and June 15). However, at most locations, the active work area affected by dredging at any time will be a small portion of the entire area. This will allow some fish to largely avoid the dredge, using the remaining area as a refuge. The fish loss may be proportionally higher in the bottom-dwelling species than the open-water species (the Muddy River would actually benefit from substantially fewer bottom-dwelling species). Because Spring Pond contains a rare fish species, the Threespine Stickleback, no construction work will directly affect Spring Pond. The stickleback has also been found in a small pool in Willow Pond where the water from Spring Pond falls below a small stone dam. Sticklebacks in this pool will be temporarily relocated to a holding pond and the Willow Pond pool will be preserved by silt curtains and sheeting during dredging in Willow Pond. The stone dam will be repaired.

1.4.6 Wetlands

The proposed work includes the removal of *Phragmites*, including the extensive root system. Where one species dominates the present ecosystem, several species of shoreline and emergent plants will replace it. This will result in a substantial

enhancement of the functions and values of the aquatic, wetlands, and upland ecosystems as well as a commensurate enhancement in wildlife functions and values. The proposed project will result in “no net loss” of wetland resources.

1.4.7 Wildlife Resources

In locations where dredging occurs during winter hibernation, amphibians and reptiles that are not relocated will be lost. The contractor will be required to hire a wildlife biologist to relocate some wildlife before construction begins and to return them after construction. After construction, the upland wildlife community will benefit significantly from the revegetated landscape that will feature a diverse plant selection adapted from the Olmsted plant list (excluding currently known invasive species).

1.4.8 Ecological Functions and Values

Dredging will temporarily impact the current habitat’s function and values. Long-term physical alterations are related to bank stabilization, deepening of the water body, reconstruction of an island, and the enhancement of the aquatic and upland ecosystems to more natural ecosystems.

1.4.9 Historic/Cultural Resources

Construction activities will temporarily impact a National Register listed property – Olmsted Park. However, the proposed restoration of the historic river and park system will contribute to preserving the Olmsted legacy as the country’s most famous landscape architect.

1.4.10 Recreation

Construction activities will disrupt recreational use of portions of the park system by creating noise, odors, and realigning walking trails. However, following construction, the primary impact to recreational use of the park system will be beneficial.

1.4.11 Traffic and Noise

Project construction will add traffic to regional roadways providing access to the study area and to local roadways abutting the Muddy River. Construction will also result in some temporary, but unavoidable, noise impacts. The project will have no long-term effects on traffic flow or noise conditions.

1.4.12 Mitigation

Mitigation of construction-related impacts will be implemented in two ways:

- Contract documents will include specifications on requirements that the contractor must meet to reduce environmental impacts; and
- The contractor will prepare plans for approval on how work will be conducted to limit environmental impacts. These plans include, but are not limited, to:

- Dredging and Dredged Material Management

- Stormwater/Dewatering Pollution Prevention Plan
- Water Quality Monitoring
- Traffic Mitigation Plan
- Rodent Control Plan
- Historic and Natural Resources

A Resident Engineer and an Independent Environmental Monitor (IEM) will monitor compliance with the contract documents and contractor's submitted plans. The IEM will be part of the proponent's construction monitoring team, but not responsible for the construction contract's commercial terms. The IEM will report violations of the mitigation measures and environmental permits to the construction management team.

1.5 Previous MEPA Submittals and MEPA Requirements

The Massachusetts Environmental Policy Act Unit (MEPA) is the agency of the Commonwealth with responsibility for environmental impact review. Projects that require certain state approvals, that meet or exceed impact-related thresholds, and/or that require state funding are subject to review under MEPA. The extent of the process can vary depending on the project, but common to all projects is a requirement for public disclosure and comment.

1.5.1 Environmental Notification Form/Notices of Project Change

For the Muddy River Project, an Environmental Notification Form (ENF) was submitted to the state in January 1999. The Secretary of Environmental Affairs issued two Certificates on the ENF on April 29, 1999 – one for the scope and requirements for the EIR, the other establishing a special review procedure, as outlined below:

- A Draft and FEIR covering the entirety of the project;
- An opportunity for the Charlesgate portion of the project to proceed following the MEPA review and certification of the DEIR; and
- Filing and public review of updates on the project progress annually after the FEIR review is completed.

In addition, the special review process included the designation of a Citizens Advisory Committee (CAC) by the Secretary of Environmental Affairs, as described further in Section 1.5.3.

Two Notices of Project Change (NPCs) were also filed in 2001. The first NPC involved separation of the combined sanitary/storm sewer to a separate storm drain and sanitary sewer system at the Boston Park and Recreation Department's Back Bay Yard. The second NPC involved cutting and removal of plant material at the Agassiz Bridge. The Secretary of Environmental Affairs determined that neither NPC

required further environmental review in Certificates issued on September 21, 2001 and October 15, 2001, respectively.

1.5.2 Establishment of the Citizen's Advisory Committee

At the request of the project proponents in the ENF, a CAC was established to assist the Secretary in the environmental review of this project. Supported by project proponents administratively, the CAC met regularly (i.e., 52 times between September 1999 and December 2002 and an additional nine times between completion of the FEIR and the SFEIR) with the proponents and their consultants to provide input on all aspects of the project. The CAC also held meetings to inform the public on the project status. Early drafts of report sections were also provided to the CAC for review prior to MEPA submittal.

1.5.3 Draft and Final Environmental Impact Reports

The DEIR was filed in January 2002. Two Certificates were issued by the Secretary of Environmental Affairs on April 16, 2002 – one on the DEIR, indicating that it “adequately and properly complies with the Massachusetts Environmental Policy Act” (see Appendix A of the FEIR) and a Draft Record of Decision (ROD) allowing the Charlesgate element of the project to proceed to permitting prior to submission of the FEIR (see Appendix B of the FEIR).

The Draft ROD Certificate proposed to grant a Phase One Waiver allowing the Charlesgate element of the project to proceed to the state permitting agencies pending completion of the FEIR and subject to the satisfaction of conditions.

The project proponents submitted a letter to MEPA on July 1, 2002 (see Appendix B of the FEIR) in response to the requirements of the Draft ROD. The Final ROD, issued by the Secretary on July 29, 2002 (also in Appendix B of the FEIR), granted the Phase One Waiver for Charlesgate and acknowledged compliance with most of the requirements of the Draft ROD. The requirements included:

- Creation of a workplan and schedule for implementation and maintenance of basin-wide non-structural BMPs. The work plan also needs to expand on treatment and maintenance for the Charlesgate element and address permitting requirements of the MDC (now DCR);
- Commitment to completion of basin-wide evaluative studies for potential structural BMPs during 2002 so that results can be fully reflected in the FEIR;
- Maintenance of the project schedule presented in the DEIR (submit FEIR no later than January 31, 2003);
- Creation of a dedicated funding source to support basin-wide BMP implementation and other maintenance measures; and
- Implementation of a management structure, through the creation of an independent oversight body, representing the full range of stakeholders.

The most significant issue requiring further evaluation in the FEIR was the structure and function of the independent oversight committee (subsequently named the Maintenance and Management Oversight Committee, or MMOC). The Final ROD required that all outstanding issues related to the management and structure of the committee be resolved by December 1, 2002. These issues were addressed in a November 27, 2002 letter to the Secretary (see Appendix B of the FEIR).

The Certificate on the DEIR, issued on April 16, 2002, stated that the DEIR provided enough information to demonstrate that the preferred alternative generally minimizes environmental impacts, and presents a generally complete description of the project, its alternatives, and its impacts. However, several important issues were noted as being unresolved. Specifically, the Secretary called for more detailed information on wetlands and water quality impacts; more information on alternatives; a more detailed, specific, and enforceable Maintenance and Management Plan; responses to the numerous comments on the DEIR; and responses to other issues outlined in the Certificate. The Secretary also noted that the FEIR may incorporate by reference those portions of the DEIR that do not require further analysis.

The Certificate on the FEIR, issued on May 1, 2003, required that a Supplemental FEIR (SFEIR) be prepared to provide additional information on alternatives, impacts, and mitigation, while reiterating EOE's commitment to the "successful implementation of this important public project."

The document contained herein is the SFEIR, which addresses the issues raised by the Secretary in her Certificate on the FEIR and relevant comments submitted by interested parties. It is important to note that, since issuance of the FEIR Certificate, there have been meetings with MEPA and other agencies (including the Department of Environmental Protection, or DEP, and the USACE), as well as other stakeholders, to advance project planning and resolve outstanding issues (including many issues from the FEIR Certificate and comment letters). This SFEIR reflects the results of those discussions.

1.5.4 Annual Update

The special review procedure for the Muddy River Project mandates that the MEPA office and project commenters be updated annually following the completion of the SFEIR. Of interest are the status of physical improvements, management practices, and information regarding current environmental conditions gathered through monitoring. The Annual Updates also will provide the necessary documentation regarding later phases of the project whose impacts are not evaluated in detail in this SFEIR.

The first Annual Update is anticipated to be filed one year after construction commences, probably during the second quarter of 2006.

As required by the Secretary of Environmental Affairs, a proposed outline reflecting a scope of work for the Annual Updates for the project has been prepared (see Section 9 of the FEIR). The concept of continuity drives this outline, as does a need for

flexibility with respect to the sequencing of future project phases. Each report will build upon the report that precedes it, providing an update with respect to interim progress in implementation of funded project elements and on success with regard to funding of future project elements. The Annual Update will be circulated to all parties who commented on either the ENF or EIR.

1.6 Project Updates Since FEIR

1.6.1 Summary of Record of Decision Status and Compliance

The proponents have completed the following activities pursuant to the Final Record of Decision:

- Created a work plan and schedule for implementing basin-wide non-structural BMPs;
- Clarified the maintenance commitments for Charlesgate;
- Committed to evaluating and preparing a basin-wide structural BMP plan;
- Proponents submitted the FEIR on February 18, 2003;
- Letters were submitted to MEPA regarding dedicated funding sources; and
- Independent oversight body (the MMOC) has been formed and held 17 meetings between October 2002 and completion of the SFEIR.

1.6.2 State and Local MOU for Funding and Administering the Project

In November 1999, a Memorandum of Understanding (MOU) amongst local and state agencies involved in the project was executed. Its purpose is to facilitate cooperation amongst the respective authorities in project planning, permitting, funding, and implementation. The MOU allows for the transfer of funds between participating parties and provides commitments for adherence to all applicable regulatory or programmatic requirements. It also summarizes financial commitments for Phase 1 of the project from participants.

The 1999 MOU will be amended to include the DCR as a signatory. Furthermore, an outline of a Memorandum of Agreement (MOA) has been completed by a committee consisting of representatives from Boston, Brookline, the state, the ENC, and the MMOC (see Appendix D of this SFEIR). The MOA will define the roles and responsibilities of each party and park maintenance commitments.

1.7 Overview of Document Contents

This SFEIR contains the following information:

- Section 1 – Introduction
- Section 2 – Project Description

- Section 3 – Project Benefits and Impacts
- Section 4 – Alternatives
- Section 5 – Wetlands and Water Quality
- Section 6 – Project Permitting
- Section 7 – Stormwater Management/Pollution Control
- Section 8 – Maintenance and Management Structure
- Section 9 – Maintenance and Management Plan (on CD)
- Section 10 – Historic Resources
- Section 11 – Rare Species
- Section 12 – Recreation Impacts
- Section 13 – Responses to FEIR Comments
- Section 14 – Mitigation and Section 61 Findings

In addition, the SFEIR contains a number of supporting appendices.

2

Section Two

Section 2

Project Description

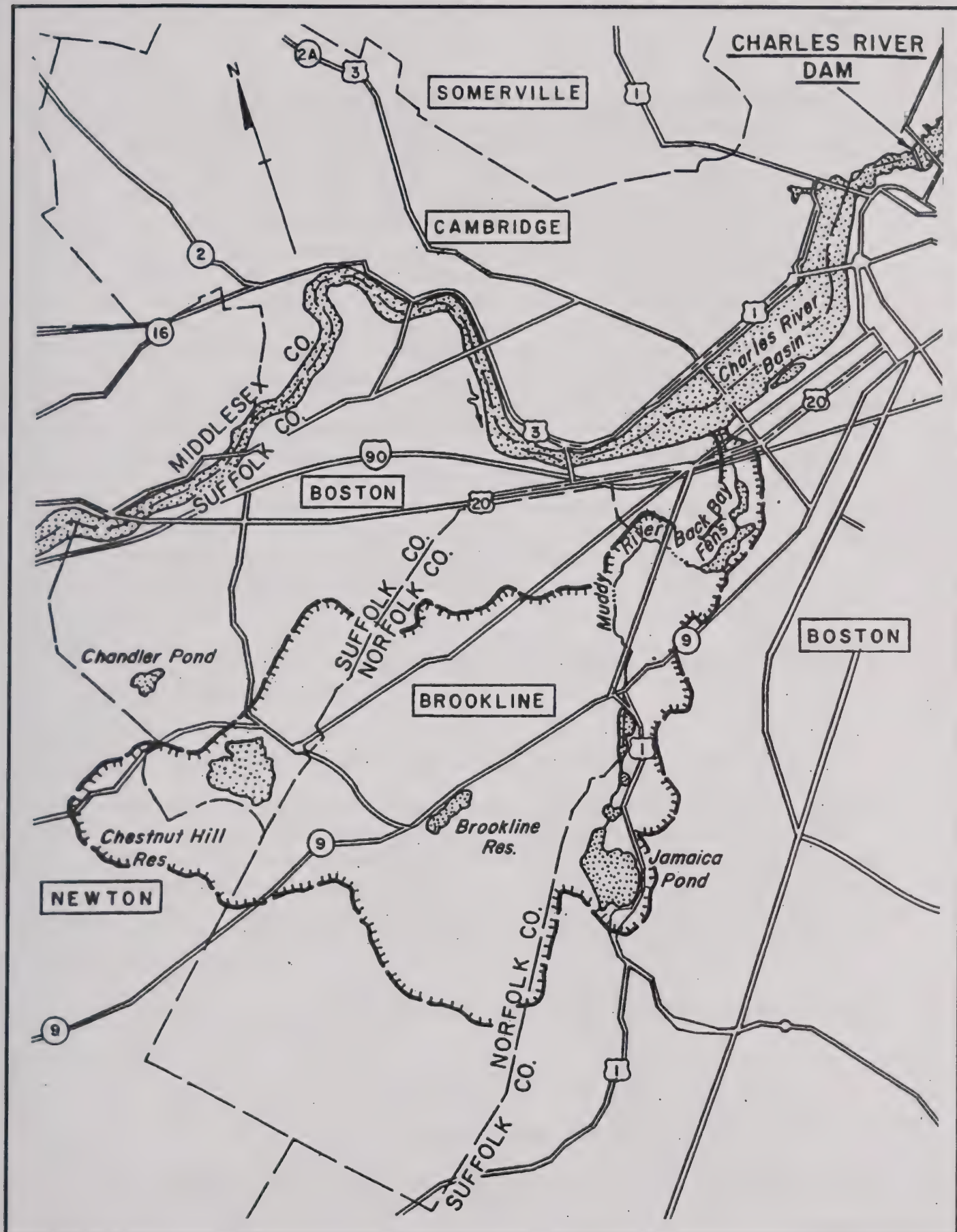
2.1 Introduction

The Muddy River project area is a portion of the Emerald Necklace, the historic core of the Boston and Brookline park system consisting of a series of linear parks of nearly 1,000 acres. The Muddy River is a small waterway located in the Boston metropolitan area (see Figure 2-1). The river flows through the heart of Frederick Law Olmsted's "Emerald Necklace," one of America's most famous urban park systems.

The Muddy River park system runs from Ward's Pond down through Charlesgate at the Charles River and forms the border between Boston and Brookline with each municipality responsible for its own lands. The City of Boston, through the Boston Park and Recreation Department, is responsible for maintaining 117 acres of parkland within the project area. The Town of Brookline, through the Parks and Open Space Division, is responsible for maintaining 32 acres of parkland within the project area. The Department of Conservation and Recreation (DCR), formerly the Metropolitan District Commission (MDC) owns the Charlesgate section of the Back Bay Fens and is responsible for the care, custody, and control of the parkways and parkland located 25 feet in from the curb, an area totaling approximately 35 acres within the project area. Although the park is an exceptional recreational resource and provides important wildlife habitat in a highly urbanized setting, its value is compromised by flooding, poor water quality and other related water resource problems.

The Muddy River watershed has been subject to the effects of gradual urbanization for several centuries. The results of development on river and aquatic resources have been significant. All tributary streams and associated wetlands have been filled or culverted. Construction of the Charles River Dam in the early 1900s converted part of the waterway from a tidally influenced salt-water estuary to a freshwater system. Flooding has worsened because there is little natural storage left in the watershed, and accumulated sediment, vegetation, and debris in the river constrict flood carrying capacity. Water quality has deteriorated as an array of natural and man-made compounds are carried off the land surface during rainstorms and deposited into the river. Poor water quality and sediment quality, degraded fish and benthic invertebrate communities, elevated contaminant levels in fish, and outbreaks of avian botulism have also been documented. Non-native invasive species of flora such as *Phragmites* and knotweed have proliferated, crowding out native species, and limiting the diversity of riparian and wetland plant communities.

The proposed project is derived from numerous engineering and historical studies of the project area's problems including the Emerald Necklace Parks Master Plan ("the Master Plan") by the City of Boston and Town of Brookline, and flood control studies by the USACE, the City of Boston and Town of Brookline, and the FEMA.



Source:
ACOE, EA June 2003

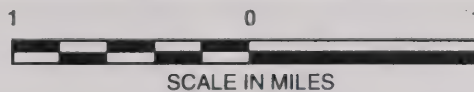


Figure 2-1
Muddy River Watershed Map

The proposed USACE project is designed to address a number of the problems described above. Principal objectives include flood damage reduction and restoration of aquatic and riparian habitat (environmental restoration). Local sponsors are also very interested in restoring the historic landscape and other cultural resources within the Emerald Necklace park system. Therefore, the “locally preferred plan” includes more historic plantings (from the original Olmsted plant list) than the USACE plan. Another difference between the USACE plan and the locally preferred plan is a difference in the depth of, and justification for, dredging of Leverett Pond. The USACE proposes a 4-foot dredging depth, whereas local sponsors propose a 2-foot dredging depth. The USACE justification for dredging the pond is contamination and environmental restoration. The local justification is restoration of historical configurations. In addition, the USACE proposes aeration only for addressing the dissolved oxygen and eutrophication problems at Ward’s Pond because the sediment quality is good; whereas the local plan preference for restoring Ward’s Pond is dredging. Given these differing plans for Ward’s Pond, the USACE has agreed to fund the local plan – though not to exceed what the costs for aeration would have been; hence, the difference between the aeration and dredging costs would need to be funded by non-Federal interests. In the Riverway, the dredging limits are similar in both plans where the USACE goal is the combination of flood control in limited locations and environmental restoration in the remainder of the Riverway. The local plan is based on restoration of historic configurations and flood control.

2.2 Overview of Proposed Dredging Plan and Sediment Management

2.2.1 Introduction

This section presents the overall general plan for dredging the Muddy River.

Dredging will be performed in two segments. The first is in the Charlesgate area (this work has been completed through a MEPA Phase I Waiver) and the second will be from Back Bay Fens upstream to Ward’s Pond. Dredging cannot be performed during weather that is cold enough to freeze the water because it affects the dewatering process. Dredging is also prohibited during the period between March 1 and June 15 of any year in order to protect the habitat of river herring, blueback herring, and rainbow smelt.

Although each reach of the river and the ponds will be dredged sequentially, the five steps for each will be similar:

1. Mobilization and Initial Activities (Section 2.2.2)
2. Conduct *Phragmites* Removal and Dredging Operations (Section 2.2.3)
3. Sediment Dewatering at Staging Areas (Section 2.2.4), Ultimate Reuse/Disposal of Dewatered Sediment (Section 2.2.5), and
4. Post-Dredging/Construction Activities (Section 2.2.6).

Each of these steps is addressed below. The description that follows is the proponents' plan for completing the work. If the USACE completes portions of the work, the details and specifications may be different, although the intent is expected to remain the same.

2.2.2 Mobilization and Initial Activities

During mobilization and initial construction activities, erosion and sediment controls will be installed, staging areas prepared, and pre-dredge "debris field" will be cleared.

2.2.2.1 Installation of Land-based Erosion and Sedimentation Control

Staging areas and locations for accessing the river will have erosion and sediment controls as described in specification section 02270 in Appendix I of the DEIR. Staked hay bales and siltation fences will be located between the wetland resource areas (whether Bank, Bordering Vegetated Wetland, or Land Under Water) and the designated access/staging area.

2.2.2.2 Preparation of Staging Areas

Actual construction staging will depend on the logical sequence of construction necessary to complete this work. The contractor will be required to submit a dredge work plan that will include construction and sequencing. At all staging areas, the contractor will place a crushed stone layer over the staging area to minimize erosion of existing soil. All staging areas will also be lined with 40-mil HDPE material prior to use to prevent contamination from spills. The staging areas will be secured and surrounded by chain-link fencing for pedestrian safety and site security. Only construction vehicles and equipment (and limited contractor parking) will be allowed within staging areas. Some travelways and pedestrian walkways will be temporarily closed to general traffic and pedestrians.

2.2.2.3 Pre-dredge Debris Field Clearance

The dredging contractor may need to perform some type of pre-dredge "debris field" clearance. The specifications will indicate that debris is anticipated, and it is the contractor's responsibility to remove the debris (as well as the sediment). Therefore, it will be up to the contractor to determine whether a pre-dredge debris field clearance is needed to meet the terms of the specifications. In Charlesgate, the debris included shopping carts, bicycles, tires, clothing, wood, trash, etc., which was removed by using a Gradall in the stream equipped with a modified tyne bucket. The tynes remove large debris and leave the sediment.

2.2.2.4 Installation of In-stream Sedimentation Control

During dredging, care will be taken to minimize erosion and sedimentation along the river and at the staging areas. The use of hydraulic dredging methods will minimize re-suspension of sediment because the water serves as the transport medium for sediment and is pumped through the pipeline to the staging area. In addition, the dredge can be fitted with a hood near the cutter head that keeps re-suspended sediment close to the dredge. Where mechanical removal methods are used, silt

curtains and oil absorbent booms will be placed in the river at either end of the dredge area to contain sediment. Return water from the sediment dewatering will be discharged to the river within a silt curtain following treatment.

2.2.3 Dredging Operations and *Phragmites* Removal

The first phase of construction will entail channel dredging and management of the dredged material. Construction work from the staging areas will include dredging, removal of invasive species (such as *Phragmites australis*), refilling shoreline areas, and final regrading to historic shoreline configurations.

Removal of *Phragmites* will be accomplished by mechanical means (backhoe, low-impact excavator, or equivalent), and the root mass will be disposed of off site. *Phragmites* stalks and root mat will be removed using a combination of mechanical methods. This material does not contain much excess water; therefore, it will be handled separately from the sediments to avoid increasing dewatering needs. The stalks will be cut by small all-terrain equipment or by hand where required, mulched, and loaded into small trucks for disposal. A small, barge-mounted backhoe or low-impact excavator that can be supported on the root mat will then remove the upper layer of the root mat and load it onto a spoils barge or truck. Care will be taken to minimize mixing the root mat with underlying sediment where it could clog the dredge and recolonize the sediment. Once the root mat is removed, the underlying sediment will be dredged with a hydraulic dredge.

The work conducted at Charlesgate suggests that the sediment in other parts of the river may contain more cobbles and boulders than indicated by the borings. (Cobbles range from 6 to 12 inches in diameter, and boulders are greater than 12 inches.) At Charlesgate, the presence of cobbles and boulders caused the contractor to propose modified operations. The auger hydraulic dredge purchased by the contractor could not be used to remove the stones. Additional sediment testing will be done during design to determine if these materials are present elsewhere. An excavator will be used to sample the sediment for visual inspection to estimate the proportion of stones and debris. The sediment will then be returned to the river bottom.

Mechanical dredging and hydraulic dredging were re-evaluated based on the Charlesgate experience. The dredge manufacturer for Charlesgate indicated that a jetting ring that uses water jets to loosen sediments, but not stones, would be appropriate for the conditions there. Other modifications of the equipment may be used, such as a bar screen to keep rocks out of the pump. The cobbles and boulders may be allowed to remain in the river, provided that enough fine-grained sediment is removed to achieve the required depths. Overdredging may be necessary to accomplish this. As a result, hydraulic dredging is expected to remain the preferred method. If there are areas where hydraulic dredging is not feasible, mechanical dredging will be used.

Hydraulic dredging involves the use of a barge-mounted suction boom with a mechanically operated cutter head or jetting ring. The boom is positioned at the front of the barge and angled to the desired dredging elevation. The cutter head churns up

the sediment and mixes it with water to form a slurry. The slurry is then sucked through a pump mounted on the barge and pumped through a pipeline connected to dewatering equipment on shore at the staging areas. Depths can be set so that the proper grades are maintained, and in some cases the cutter head can be fitted with a hood to minimize the amount of sediment that is re-suspended in the water.

Dredging equipment will enter the river and ponds directly from the staging areas. As described in the DEIR, the Back Bay Fens, the Riverway area, Leverett Pond and Ward's Pond will be dredged hydraulically to the extent possible. A combination of hydraulic dredging and mechanical dredging with small, specially designed equipment may be required in the narrow, shallow river segments in Riverway South.

The dredged sediment will be pumped to a nearby staging area (one of six) for dewatering. *Phragmites* removed (where bank-to-bank dredging is proposed) will be loaded onto a spoils barge or truck.

2.2.4 Sediment Dewatering at Staging Areas

Section 2.4 provides details on dewatering issues such as the discharge of belt filter pressate, the lime stabilization process, the TC-Lead treatment process, and layouts of the staging areas, in response to the MEPA Certificate and comment letters on the DEIR. The section below provides an overview of the sediment dewatering process at the staging areas.

The hydraulically dredged sediment will be dewatered by mechanical methods using belt filter presses or centrifuges. In this method, the sediment is pumped from the dredge through the pipeline to the staging area and into a storage tank. The tank contains mechanical mixers, which keep the sediments in suspension in the tank. The tank acts as a buffer between dredging and dewatering since the dredge can remove sludge at a higher rate than the dewatering equipment can dewater it. From the storage tank, the sediment will be pumped to the dewatering equipment and may be conditioned with a polymer depending on its dewatering characteristics.

Sediment from the hydraulic dredge will be pumped through a storage tank to provide a feed to the dewatering process. The sediment will be pumped from the storage tank to the belt filter press or centrifuges mounted on 18-wheel flatbed trucks. The dewatered sediment solids will be discharged from a chute on each dewatering unit onto a belt conveyor, which will discharge the solids into dump trailers for hauling and reuse or disposal. If necessary, the product can be stabilized with lime for reactive sulfide control and to reduce odor potential, as discussed further in Section 2.4.4. The dewatered sediments will be approximately 22 to 25 percent total solids and contain no free water. This material will pass the paint filter test and will be suitable for hauling in dump trucks or dump trailers.

Some contractors may propose a passive method for dewatering instead of belt filter presses. At Charlesgate, the contractor was approved to use "geotubes." With this method, the sediment is placed in a fabric bag, and the water drains by gravity, which takes about two weeks. A larger storage area is needed for the longer dewatering

time. This method is most appropriate for coarse-grained sediments. At Charlesgate, the contractor used grain size distributions and pilot testing to determine that the geotubes were feasible. He also had to demonstrate that the staging area was large enough to keep the schedule from being impacted by the longer dewatering times. In future contracts, the contractor(s) would once again be required to justify passive dewatering operations, including having sufficient space. It is unlikely that this approach could be allowed for the entire operation but may be allowed for small, distinct segments. (Note that while this method was approved for use at Charlesgate, it was not used because the dredging was mechanical rather than hydraulic.)

The resulting filtrate from the dewatering process typically is settled in a basin and possibly filtered prior to returning it to the waterway. Weekly sampling may include total suspended solids (TSS), total and dissolved lead and other materials, and dissolved oxygen (DO). In order to be discharged, TSS must be less than 40 mg/l, dissolved lead must be less than 1.0 micrograms/l above the background level, and DO must be 5 mg/l or more. Parameters to be tested will be determined during the permitting process and may vary by river segment. Due to the nature of the dredging and dewatering process, no work can be conducted during extended periods of freezing weather nor during the period March 1 to June 15 to protect fish habitat.

At staging areas servicing Back Bay Fens and The Riverway, both sediment and *Phragmites* will be processed. As described above, the *Phragmites* and other invasive species currently growing in the Back Bay Fens and Riverway will be removed during river dredging. The *Phragmites* will be loaded into barges and then to trucks or directly into trucks.

Dewatered sediment will be loaded onto 18-wheel dump trucks (approximately 20 cy per truck) at a rate of approximately 1 truck per hour.

2.2.5 Sediment Processing and Reuse/Disposal

There are four reuse/disposal options and one treatment option for the sediment after dredging and mechanical dewatering are completed. The reuse/disposal options are dictated primarily by the chemical contaminant levels in the sediment and include disposal at a RCRA landfill, reuse or disposal at an out-of-state landfill, reuse at an in-state lined landfill, and reuse at an in-state unlined landfill. The treatment option consists of binding (immobilizing) certain chemical contaminants (i.e., metals) in the sediment into insoluble minerals and mixed mineral forms, rendering the sediment matrix non-hazardous.

Disposal of the sediment at RCRA landfills will be required when the chemical contaminant levels exceed RCRA characteristic and listed waste thresholds defined in 40 CFR 261 and cannot be a TSCA waste as defined in 40 CFR 761.

Disposal or reuse of the sediment at an out-of-state landfill(s) will be required when the chemical contaminant levels exceed the in-state reuse criteria and DEP does not approve their reuse in-state, as provided in Policy No. COMM-97-001, or when the demand for reuse materials is low. However, chemical contaminant levels in the

sediment cannot exceed RCRA characteristic and listed waste thresholds in 40 CFR 261 and cannot be a TSCA waste as defined in 40 CFR 761.

Reuse of sediment at in-state lined and unlined landfills can occur with no specific DEP review or approval when chemical contaminant levels are below the following criteria listed in Policy No. COMM-97-001, as summarized in Table 2-1:

Table 2-1
DEP Criteria for Landfill Disposal

Contaminant	Lined Landfill (mg/kg)	Unlined Landfill (mg/kg)
Total Arsenic	40	40
Total Cadmium	80	30
Total Chromium	1,000	1,000
Total Lead	2,000	1,000
Total Mercury	10	10
TPH	5,000	2,500
Total PCBs	<2	<2
Total SVOCs	100	100
Total VOCs	10	4
Conductivity	8,000 umhos/cm	4,000 umhos/cm
Listed or Characteristic Hazardous Waste	None	None

Source: DEP Policy No. COMM-97-001

When contaminant levels exceed these criteria, then DEP review and approval is required for reuse of the sediments or for any disposal option.

Treatment of TC-lead sediment on site will be permitted provided that DEP concurs with its use on this project (see Section 2.4.6). Treatment will occur either during the mechanical dewatering process or during loading into roll-off box containers. In either case, the sediment will be stored in roll-off box containers in secure areas under lock and key. Roll-off box containers will not be removed until test results are received to confirm that the process has rendered the sediment non-hazardous. Proposed confirmatory sampling will include one sample per roll-off box composited up to 100 cubic yards. Disposal and reuse of the sediment following treatment will be at an out-of-state landfill and in-state lined and unlined landfills, as dictated by the other chemical levels (i.e., total metals, petroleum, PCBs), physical characteristics, and market conditions, as noted above.

For purposes of pricing in the DEIR, it was assumed that sediment that is chemically suitable for reuse at in-state landfills will be disposed of at out-of-state lined landfills. CDM's experience is that the physical characteristics of the sediment (percent moisture and percentage of fine material) are likely to cause the landfills to reject the material, thereby requiring an alternate disposal site. Therefore, in-state landfills are not considered to be a likely reuse option.

Prior to the shipment of any sediment off site, the following information will be received on each disposal and reuse facility:

- Facility Name;
- Facility Address;
- Name of Contact Person;
- Name of Emergency Contact Person;
- Titles of Contact Persons;
- Telephone Numbers of Contact Persons;
- EPA Identification Number; and
- Documentation from each facility specifying the volume of sediment that can be accepted from this project on a weekly and total basis.

Written confirmation will be obtained from each facility that is permitted to accept the sediment of the general quality and quantity described. The contractor's receiving facility will also state that the facility agrees to submit to the proponent's engineer, by fax, overnight express mail, or by courier delivery within 5 days or receipt of sediment, copies of all facility signed and receipted manifests, and completed and signed bills of lading with certified scale tare and gross weight slips for each load received. The facility will identify the sediment to be accepted and reference the analytical data as the basis of this classification.

The facility will also provide a listing of all permits, licenses, letters of approval, and other authorizations to operate that the facility holds, pertaining to the receipt and management of the sediment.

The contractor will submit the facility's complete list of permitted allowable contaminant levels and physical characteristic requirements for sediment, waste stream documentation and/or profile requirements, sampling frequency requirements, and list any required regulatory approval processes that must be followed.

Prior to offsite shipment, the contractor will be responsible for preparing and submitting all waste stream profiles. Proponent's engineer will review the profiles for accuracy and completeness and obtain the owner's signature before the profiles are sent to the facility for approval.

Sediment that is disposed of at a RCRA landfill will be transported under a hazardous waste manifest. The standard EPA 8-copy form will be utilized. The contractor will be responsible for preparing the manifests prior to the shipment date for review by the proponent's engineer.

Sediment that is reused or disposed of at out-of-state landfills or reused at in-state landfills will be transported under a DEP Bill of Lading. BWSC Forms 12A, 12B and 12C will be utilized.

2.2.6 Post-Dredging Activities

Post-dredging activities include stabilization of banks, repair of riprap, mitigation planting (restoration of landscaping), historic treatment, and decommissioning of staging areas.

Once the shorelines are returned to the historic configurations, replanting will take place to stabilize the disturbed areas. The staging areas at Charlesgate, Agassiz, Kelly Rink, Netherlands Road, Fens and Lagoon will be regraded in accordance with the final grading plan and replanted in accordance with the historic landscaping plan. (Final grading plans will maintain current grades and contours of the staging areas, except at the Fens Bridge where daylighting will occur.) The Fens Bridge staging area will receive temporary stabilization consisting of regrading and hydroseeding to stabilize the area prior to daylighting.

This is consistent with the plan at the Charlesgate staging area, which is expected to be reused during future construction. Final rehabilitation will be according to a revised plan based on public participation and historic considerations.

Additional post-dredging activities are summarized below (see plans in Appendix I of the DEIR for specific activities in each area):

- Stabilization of banks after dredging.
- The original shoreline, landscape and grading will be restored. The work will include wetland planting, bank planting and upland planting of both shrub and tree layers to improve wildlife habitat and to historically restore the landscape. As described in the DEIR, the Olmsted plant lists will be used to guide plant selection.
- Turf-covered banks will include a wetland edge to improve wildlife habitat and lawn on banks and upland to restore the original historic viewsheds.
- The areas from shoreline to edges of paths and areas affected by staging will be loamed and seeded.

2.3 Dredging Summary within Each Geographic Area

Sections 2 and 5 of the Preliminary Design Report (included in the DEIR as Appendix I) describe the proposed improvements in detail, including dredging. The following is a summary of the proposed dredging, organized according to the geographic segment of the project. Table 2-2 provides a summary of the proposed dredging in each area and compares estimates made by the USACE with estimates made by the local sponsors for this SFEIR. The primary differences are attributed to the USACE exclusion of Charlesgate dredging from consideration in the EA and the USACE proposal to dredge to a 4-foot depth in Leverett Pond.

Table 2-2
Material Removal Volumes by River Section (cy)

	<i>Locally Preferred Plan</i>				<i>USACE Plan</i>
	Sediment	Deepened Channels	<i>Phragmites</i>	Total	
Charlesgate	4,000	—	—	4,000	—
Back Bay Fens	79,961	16,518	23,474	119,953	119,000
Riverway	18,430	1,724	10,047	30,201	31,000
Leveret Pond	21,788	2,063	—	23,851	29,000
Willow Pond	5,054	842	—	5,896	5,000
Ward's Pond	15,565	—	—	15,565	16,000
Total	144,798	21,147	33,521	199,466	200,000

2.3.1 Back Bay Fens

The flood carrying capacity of the Back Bay Fens will be improved via the dredging and removal of approximately 95,500 cubic yards (cy) — 80,000 cy of accumulated sediment and debris and 15,500 cy of dredging for deepened channel sections. Approximately 23,000 cy of *Phragmites* will also be removed.

Hydraulic modeling shows that a channel section 30 feet wide at the bottom with 4 to 1 side slopes and an invert of 2.03 feet BCB reducing to 1.03 feet BCB from the Sears parking lot to Ipswich Street will be required to convey the design flood flows through the Back Bay Fens. This provides sufficient hydraulic capacity for increased flows anticipated from the improvements discussed for the Sears parking lot to the Fens Bridge area. Upstream of the lagoon area, the minimum channel dredging required for flood control is the entire channel. Cross sections in this area are in Preliminary Design Report (Appendix I of the DEIR).

Dredging in this section includes completing the partial removal of sediments between Ipswich Street and Boylston Street (Richardson Bridge) started during dredging of the Charlesgate section. *Phragmites* removal between Ipswich Street and Boylston Street would also be conducted as part of the Back Bay Fens work and not part of Charlesgate.

Dredging in the Back Bay Fens area will be conducted using hydraulic dredging equipment and dewatering. Four staging areas are proposed for dewatering equipment in this area. The Charlesgate staging area would be reused for the lower portions of the Back Bay Fens area, if needed. The Agassiz Road staging area may be

used for dredging from Ipswich Street to Agassiz Road. A staging area at the Lagoon area would be used for dredging between Agassiz Road and Evans Way along the river. The area upstream of The Fens Bridge at Avenue de Louis Pasteur (site also known as Higginson Circle) would be used for staging dredging downstream to Evans Way.

Closing Agassiz Road between Park Drive and The Fenway will create the Agassiz Road staging area. During construction, the contractor will be required to maintain a temporary pedestrian pathway along one side of the site. Access to the river on either side of Agassiz Road closest to the Hemenway Street side could be provided with little loss of existing trees. The access is principally vegetated with *Phragmites* that, once removed, will be replaced with native wetland and emergent plantings.

In addition to dredging sediments along the Back Bay Fens area, invasive species (*Phragmites australis*) will be removed using mechanical means. The *Phragmites* will be removed using backhoe equipment mounted on barges from the water. Stalks of the *Phragmites* will first be hand cut and removed by barge to the staging areas. The *Phragmites* roots will be excavated using the backhoe and the material taken out through the staging areas. Once the *Phragmites* roots are removed, any shore areas disturbed will be refilled and reshaped to the historic shoreline. This will allow a shelf to be re-established for wetland planting along the water's edge. The areas of *Phragmites* removal are discussed further in Section 5 of the DEIR.

Sediment along the Back Bay Fens area varies in quality. Disposal of the sediments will be consistent with the figures in Appendix F of the DEIR. In the final design documents, the plans will be delineated consistent with Appendix F, and will direct the contractor to dispose of sediments in the designated disposal categories based on acceptance of the data by the disposal site operators. A total of 95,500 cy of sediment and 23,500 cy of invasive species (root mass) will be removed for disposal or reuse. Approximately 71,750 cy of the material will be disposed of at an out-of-state landfill. Another 47,250 cy of material is considered hazardous material contaminated with lead that exceeds the regulatory leaching potential. The lead-contaminated material will be stabilized through treatment in containers at the staging areas provided that DEP concurs with this approach. Chemical immobilization can be used to stabilize the sediments in order that they can be disposed in an out-of-state lined landfill or reused in state.

2.3.2 The Riverway

The historic capacity of the Riverway will be improved via the dredging and removal of approximately 21,200 cy – 18,500 cy of accumulated sediment and debris and an allowance of 2,700 cy of dredging for deepened channel sections. Approximately 10,000 cy of invasive species (root mass) will be removed as well.

River cross-sections along The Riverway from the former Sears parking lot up to Leverett Pond have been reduced due to sediment deposition, and the historic capacity of the channel has been reduced. There are three small sections where the capacity is critical for flood control. The remainder currently has sufficient capacity

for flood flows. Restoration of the former cross sections returns these watercourses to their historic capacity and also increases the volume of the water bodies, thereby increasing the amount of aquatic habitat available. Dredging also removes sediment that can be moved downstream, since the improved flood flows will create higher stream velocities. Downstream improvements will result in lower flood elevations in The Riverway.

Dredging and dredge material management discussed in the following sections will be accomplished using hydraulic dredging and dewatering using belt filter presses.

One primary goal of restoring the channel cross section in The Riverway section of the Muddy River is to minimize downstream deposition of the sediments from The Riverway section. Another goal is to remove sediments containing contaminants that affect the benthic community. During the design storm, flow velocities in The Riverway vary between 0.2 and 4.2 feet per second (fps). At velocities greater than about 1.0 fps, unconsolidated sediments are moved along the river bottom. After improvements are implemented downstream of The Riverway, velocities are expected to increase to between 0.4 and 5.5 fps. The increase is due to the higher downstream capacity that will pass larger storm flows more quickly. By removing sediments to the original channel depths, less sediment can be moved and deposited in downstream dredged areas.

Dredging in The Riverway will lower the invert of the stream from between 6.0 ft. and 4.0 ft. to a new elevation that varies from 3.99 ft. below Route 9 to 3.25 ft. at The Riverway culvert near the former Sears parking lot (all elevations are BCB).

Dredging in The Riverway area will be conducted using hydraulic dredging equipment with mechanical dewatering. One staging area at the Fens at Avenue Louis Pasteur will be used for the dredging between the former Sears parking lot upstream to Brookline Avenue. One staging area at Netherlands Road is proposed for dewatering equipment in this area. All sediments will be pumped to the staging area using flexible piping laid in the riverbed.

Closing Netherlands Road between Parkway Drive and The Riverway will create the Netherlands Road staging area. During construction, the contractor will be required to maintain a temporary pedestrian pathway along one side of the site. Access to the river on either side of Netherlands Road adjacent The Riverway can be provided with minimal loss of existing trees (2 to 3). The shoreline will be replaced with historic wetland and emergent plantings originally specified by Olmsted once dredging and invasive species removal is completed.

Sediment along The Riverway varies in quality. Disposal of the sediments will be consistent with the figures in Appendix F of the DEIR. Approximately 22,600 cy of the material will be disposed at an out-of-state landfill. About 8,600 cy of these sediments are sufficiently clean to be reused in an in-state landfill; however, their physical characteristics (amount of fine materials and water content) appear to warrant out-of-state landfill disposal as well.

Shore areas disturbed by sediment dredging or invasive species removal will be reshaped to the historic shoreline and will include a shelf for planting wetland emergent species, further described in Section 5. Eroded banks will be re-stabilized using bioengineering bank stabilization methods.

2.3.3 Leverett Pond

The historic bottom elevations of Leverett Pond will be improved via dredging and removal of approximately 23,900 cy — 21,800 cy of accumulated sediment and an allowance of 2,100 cy of dredging for a deepened channel section.

The pond cross-section at Leverett Pond has been reduced due to sediment deposition, particularly at the sand bar in front of the Village Brook drain. While the reduction is not sufficient to cause additional flooding, the historic capacity of the pond has been reduced. Restoration of the former cross-sections returns these watercourses to their historic capacity and also increases the volume of the water bodies, thereby increasing the amount of aquatic habitat available. Dredging also removes sediment that can be moved downstream, since the improved flood flows will create higher stream velocities.

Dredging in the Leverett Pond would be conducted using hydraulic dredging equipment and dewatering. The Kelly Rink staging area, which is located adjacent to the intersection of Jamaica Way and Willow Pond Road, will be used for the dredging in Leverett Pond. Access to this staging area is via Willow Pond Road. Approximately 2 feet of sediment will be removed (about 23,900 cy) over most of the pond and more at the sand bar in front of the Village Brook drain. The USACE proposes to remove 4 feet of sediment due to contaminants in the sediment.

All sediments will be pumped to the staging area using flexible piping laid in the pond. It is anticipated that all material will be disposed of out-of-state. Approximately 7,200 cy of sediment from this location are sufficiently clean to meet DEP's in-state landfill reuse criteria; however, the physical characteristics likely will prevent this.

2.3.4 Willow Pond

The historic pond capacity will be restored by the dredging and removal of approximately 5,000 cy of sediment for environmental restoration.

The pond cross-section at Willow Pond has been reduced due to sediment deposition. While the reduction is not sufficient to cause additional flooding, the historic capacity of the pond has been reduced. Restoration of the former cross-section returns this watercourse to its historic capacity and also increases the volume of the water bodies thereby increasing the amount of aquatic habitat available. Dredging also removes sediment that can be moved downstream, since the improved flood flows will create higher stream velocities.

Approximately 5,000 cy of sediment (about 6 feet of depth) will be removed from Willow Pond. All sediments will be removed by hydraulic dredging. Willow Pond

sediments are contaminated with PAHs and petroleum, mandating disposal in an out-of-state landfill.

The proposed staging area location for Willow Pond dredging is at the former Kelly Rink site located adjacent to the intersection of Jamaica Way and Willow Pond Road. Access to this staging area is via Willow Pond Road.

The project will not require temporary roadway, lane, or sidewalk closures along the Jamaicaway or Willow Pond Road. All construction equipment will be staged off the existing travelway.

2.3.5 Ward's Pond

The historic pond capacity of Ward's Pond will be restored by the dredging and removal of approximately 15,600 cy of accumulated sediment and debris. The pond cross-section at Ward's Pond has been reduced due to sediment deposition. While the reduction is not sufficient to cause additional flooding, the historic capacity of the pond has been reduced. Restoration of the former cross-section returns this watercourse to its historic capacity and also increases the volume of the water bodies, thereby increasing the amount of aquatic habitat available. Dredging also removes sediment that can be moved downstream, since the improved flood flows will create higher stream velocities.

Approximately 4 feet of sediment will be removed from Ward's Pond (about 15,600 cy). Sediments will be removed by hydraulic dredging. The pond will be restored to its historic depth to prevent the wetland plant species, which currently inhabit the shoreline, from encroaching into the entire pond.

About 10 percent or 1,500 cy of the Ward's Pond sediment, which contains TCLP lead, will either be stabilized at the Kelly Rink staging area, or will be disposed of as hazardous waste as indicated in Appendix F of the DEIR. The remainder will be disposed of in an out-of-state landfill. Nearly 12,500 cy of the material are clean enough for reuse in an in-state landfill, but the physical characteristics may preclude this.

The proposed staging area location for Ward's Pond dredging is at the former Kelly Rink site located adjacent to the intersection of Jamaica Way and Willow Pond Road. Access to this staging area is via Willow Pond Road and Pond Drive. Dredged material will be pumped to the staging area through temporary piping laid along the footpaths in the park area between Ward's Pond and Kelly Rink.

The project will not require temporary roadway, lane, or sidewalk closures along the Jamaicaway or Willow Pond Road. All construction equipment will be staged off the existing travelway.

A small parking area off the Chestnut Street side of Ward's Pond will be needed during mobilization and demobilization. The Town of Brookline indicated this temporary loss could be accommodated.

2.3.6 Deepened Channel Sections

The flood control improvements include deepened channel sections in the riverbed to prevent the rapid loss of flow capacity. The location, number, and size of these deepened channel sections will be determined based on sediment transport studies to be completed during the final design stage.

2.4 Responses to Comments on Previous EIRs

2.4.1 Introduction

Secretary Durand, in the Certificate on the DEIR, states "The FEIR should provide more details on the dewatering process and sediment management in general. DEP has made a number of comments covering sediment sampling and management protocols. The FEIR should address those issues." The FEIR addressed the MEPA Certificate on the DEIR and the DEP issues. This section re-presents that information with updates, as appropriate.

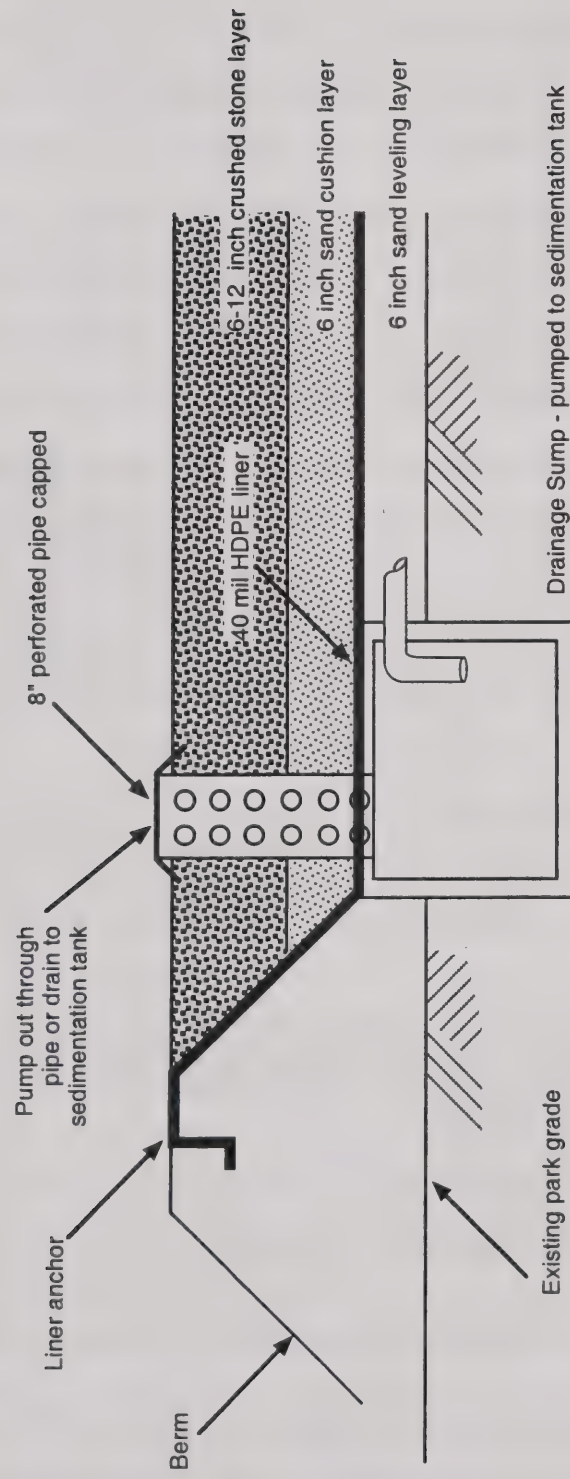
2.4.2 Staging Area Protection and Sampling

Six staging areas were proposed in the DEIR for use by the contractor during construction. The principal activities in the staging areas will be dewatering and loading out of the dewatered sediments for disposal or reuse. Two staging areas (Agassiz Road and Lagoon Area) are expected to be used by the contractor to process sediments that failed the TC-lead test procedure and will be stabilized in containers before shipment to disposal or reuse locations. This may also occur at Kelly Rink for the dredging of a very small segment of Ward's Pond.

In order to address the potential for spills during handling of the TC-lead contaminated sediment and also to address a potential alternate dewatering process similar to that proposed for the Charlesgate dredging, all the staging areas will be lined prior to use. A lining system will prevent possible contamination of the existing park land.

Staging areas or portions of staging areas proposed by the contractor to be used for dewatering and processing sediments will be prepared with a high density polyethylene (HDPE) liner. A bermed liner will be placed on a 6-inch sand leveling layer. The liner will be 40 mil HDPE liner material with a 6-inch sand cushion layer followed by 6 to 12 inches of crushed stone as a working base for the dewatering area. The bermed liner will prevent runoff from the staging area being discharged directly to the parkland. The staging area will be provided with a sump to collect runoff and rainwater and will be pumped through a sedimentation tank before discharge to the river. If there is a spill in the staging area the collected runoff will be tested prior to discharge to the sedimentation tank. A typical cross section of the staging area liner and sump is shown on Figure 2-2.

Equipment used for TC-Lead sediments will be decontaminated. This will be part of the demobilization phase of the construction. The requirements for decontamination will be spelled out in the specifications.



Staging Area Liner Cross Section (including drainage sump)

**Figure 2-2
Staging Area Liner**

Once the contractor has completed work in the staging area, the gravel and sand above the liner will be tested and appropriately disposed of. The liner will be steam cleaned and disposed of as solid waste. The sand leveling layer under the liner will be tested in 5 locations for TPH, PAH and RCRA metals. If contamination levels do not exceed those suitable for park use, then the sand will be reused as appropriate and the parkland restored to its original condition. If the sand layer is found to be contaminated, the material will be disposed of at an appropriate landfill and the park surface under the sand layer will also be tested for the compounds of concern and a suitable cleanup plan supervised by a licensed site professional will be initiated.

The turf will be aerated when the staging areas are restored to their former condition. This requirement will be included in the specifications. (At Charlesgate, the staging area will be temporarily mulched or loamed and seeded, which will not require aeration. When the dredging is complete, the Phase 2 restoration of Charlesgate will begin, and the soil will be aerated as necessary. Note that this area will be available for staging during dredging of both Charlesgate and the rest of the project.)

2.4.3 Management of Belt Filter Pressate and Odor Control Foam

Pressate from belt press dewatering (or drainage from geotubes) will be collected and pumped to a sedimentation tank prior to discharge back to the river. The contractor will be responsible for meeting water quality conditions of the Water Quality Certificate. In order to discharge to the river, the discharge must contain total suspended solids of less than 40 mg/l, dissolved lead of less than 1.0 microgram/l above the background level, and dissolved oxygen of at least 5.0 mg/l in accordance with the current Water Quality Certificate for Charlesgate.

Discharge will be analyzed once per week and the contractor will be required to increase engineering controls if the limits are not met. These controls could be increasing the size of the sedimentation tank, adding filtration, or adding polymer to improve solid removal. Discharge from the sedimentation system will be within a silt curtain in the river.

If lime is used for odor control in the sediments, pH of the pressate will be tested. The contractor will be required to reduce the pH of the pressate to between 7.0 and 8.3 before discharging back to the river.

One of DEP's concerns was the aquatic "polymer toxicity" from backdraining of the belt-filter pressate. The potential adverse ecological effects associated with the use of two products, the Callaway 4400 series polymer dewatering product and the AC-645 Long Duration Foam, were reviewed in response to this concern for toxicity. Both products could be used during dewatering of Muddy River sediments.

The Callaway 4400 product is an example of a polymer that may be used as a dewatering agent to dewater the sediments removed from the Muddy River. Very little ecological information was available from the material safety data sheet (MSDS) obtained from Vulcan Performance Chemicals. Acute toxicity tests were performed on freshwater crustaceans (*Ceriodaphnia dubia*) and fathead minnows (*Pimephales*

promelas). Results indicated a LC₅₀ (Lethal Concentration 50 – concentration at which 50 percent of the exposed organisms die) of 37.9 mg/L for a 48 hour exposure for the freshwater crustaceans and 1.07 mg/L for a 96 hour exposure for the fathead minnow.

The primary constituents of the Callaway 4400 series include petroleum distillates and adipic acid. Below is a summary of the potential adverse ecological effects for each of these constituents. The toxicity information was obtained from the Hazardous Substance Database (HDSB), an online database provided by the National Library of Medicine.

Adipic Acid - According to environmental fate and exposure information provided in the HSDB, if adipic acid is released into water, it is not expected to adsorb to suspended solids and sediments in the water column and the potential for bioconcentration in aquatic organisms is low. Biodegradation is likely to occur. In a river die-away test, 90 percent of the adipic acid degraded within 7 days. In addition, volatilization from water surfaces is not expected to be an important fate process.

Petroleum Distillates - Petroleum distillates is a broad category of chemicals that encompasses a large mixture of hydrocarbon compounds. Therefore, only a general discussion of potential toxicological effects to the aquatic environment can be presented. According to environmental fate and exposure information provided in the HSDB, if petroleum ether/distillates are released into water, volatilization will be rapid (2.5 hours to 2.7 hours from a model environmental river) and bioconcentration in aquatic organisms may not be an important fate process.

Also evaluated was AC-645, a foam barrier used to control dust, odors and volatile organic compounds (VOCs) during active excavation activities at hazardous waste sites. According to information provided by RUSMAR Foam Technology, in its foamed state, AC-645 is 95 percent air. Of the remaining 5 percent, 90 percent is water and 10 percent is solids. AC-645 is biodegradable.

The primary constituents of the AC-645 Long Duration Foam include alpha olefin sulfonate, triethanolamine stearate, potassium polyacrylate, and potassium phosphate. Very little ecological information is available for these individual constituents. Below is a summary of the potential adverse ecological effects (if any) available for each of the constituents. The toxicity information was obtained from RUSMAR Foam Technology and various material safety data sheets.

Alpha olefin sulfonate – Complete biodegradation (100 percent) occurred in less than 10 days (die-away test)

Triethanolamine stearate – No ecological information is available.

Potassium polyacrylate – No ecological information is available.

Potassium phosphate – Potassium phosphate is not biodegradable.

Based on the available ecological data, it can be concluded that both the Callaway 4400 dewatering agent and the AC-645 odor suppressing agent can be used in dewatering Muddy River sediments without adverse ecological effects to the river.

2.4.4 Lime Stabilization of Sediment and Odor Control

Regardless of the staging locations and method of dewatering, lime stabilization will be used as needed to deal with sulfide reactivity and odor control. (This will be in conjunction with the use of foam and tarps for odor control.) The contractor will be required to have the necessary equipment on site at all times. The lime will be delivered in pneumatic bulk carriers, or in bags if quantities are small, and stored in fully enclosed containers to prevent generation of dust. The lime slurry will be prepared in a batch plant and mixed with the sediment at the head of the belt filter press (or geotubes, if used). The lime stabilization equipment will occupy an area 20-feet by 20-feet as shown in the staging area schematic in Figure 2-3. An alternative will be allowed whereby the contractor prepares the lime slurry off site and delivers it to the work area. The contractor may also use enclosures over the dewatering operations or tarps over the geotubes (if used) to control odors on site. In addition, the contractor will be required to have odor control foam available on site at all times (e.g., AC-645 as described in Section 2.4.3). Foams are effective in preventing off-gases originating from stockpiles, containers, or exposed sediments and will be used if the situation requires.

2.4.5 Post-Dewatering Sampling

There were several comments on the DEIR regarding the need for post-dredging/dewatering sampling. CDM has identified three facilities that can accept the dewatered material based on the in-situ sampling ("characterization") and the opinion of an LSP regarding the adequacy of the testing program ("classification"). (Telephone call reports to these facilities are contained in Appendix F, Attachment F-1 of the DEIR.) A preliminary review by CDM's LSP determined that sufficient sampling has been conducted and that the in-situ data are representative of the dewatered material. The contractor will be expected to provide a similar opinion to allow reuse/disposal facilities to accept material based on the in-situ sampling results. At Charlesgate, the disposal facility did not require post-dewatering sampling, based on the pre-dredging information provided. The contractor would then propose the use of these facilities, subject to approval by the engineer. This is the preferred alternative for sediment management, other than for TC-Lead treatment.

If "unusual" materials are encountered and identified by on-site staff or if the reuse/disposal facilities proposed by the contractor require additional sampling, then the sediments would have to be stored on site in roll-off containers, as the TC-Lead sediments are being handled. The contractor will have to provide for these contingencies. If "unusual" materials are present, then they were not identified during the in-situ sampling and are likely to occur in relatively small, isolated areas. Assuming that the dewatering operation requires 30,000 sf, then each of the proposed staging areas, except for Netherlands Road, has excess capacity for post-dewatering sampling and storage. (The Agassiz area is proposed to be used in conjunction with the Lagoon area for TC-lead sediments and post-dewatering sampling will be conducted.) Additional area will be available at the Charlesgate staging area.

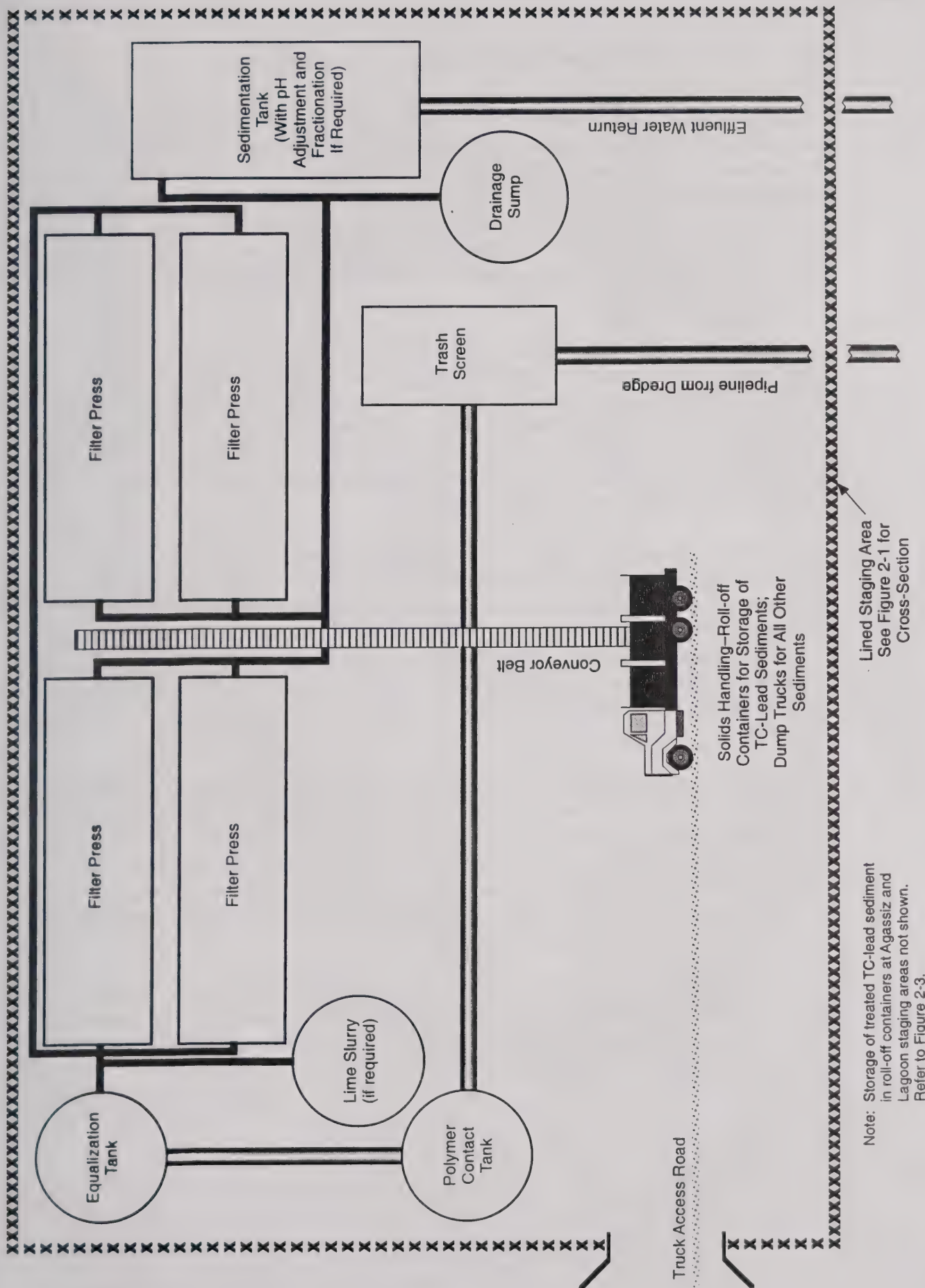


Figure 2-3
Schematic of Staging Area

2.4.6 TC-Lead Treatment and Staging Area Layouts

The preferred alternative for the handling of TC-Lead sediment in the Back Bay Fens is to use two staging areas, subject to DEP approval. This would allow a production rate of 400 cy per day to be achieved. Dewatering would take place at Agassiz Road. The sediment would be treated either during dewatering or as it is loaded into roll-off containers following dewatering. The treatment would convert leachable lead into insoluble minerals and mixed mineral forms and render the sediment matrix non-hazardous. The containers would be trucked to the Lagoon staging area, sampled, stored pending receipt of the sampling results from the laboratory, and trucked off site for reuse or disposal.

The containers would be trucked between the two areas along a 600-foot section of Park Drive. Trucks leaving the Agassiz area would make a left-hand turn onto Park Drive and a left-hand turn into the Lagoon area. Park Drive is a one-way road, and traffic disruptions would be minimal. Trucks would return by Park Drive to Boylston Street to Park Drive. The trucks and containers would be washed down before leaving the Agassiz area. The containers would be covered during transport to the Lagoon area and easily trucked between site locations.

An alternative approach would be to use both staging areas, with both dewatering and storage operations taking place at each one. This is shown on Figure 2-4. This alternative would eliminate the need to transport the roll-off containers for storage. It would achieve a lower production rate of 370 cy per day (100 cy per day at Agassiz and 270 cy per day at Lagoon) because additional space would be required for the second dewatering facility at Agassiz. The lower production rate could extend the schedule for this part of the project, and the second dewatering facility would increase the cost.

The schedule presented in the DEIR is based on a production rate of 400 cy per day. The preferred alternative for handling TC-Lead sediments, described above, can meet that schedule. Other alternatives that may be proposed by the regulatory agencies, contractors, or other parties could extend the schedule for this part of the project. For instance, the use of "geotubes" for dewatering would limit production to 130 cy per day. The engineer would approve this method only if the contractor could show that the schedule would not be adversely impacted.

TC-lead sediments from Ward's Pond will be treated similarly at the former Kelly Rink site staging area. However, space is not expected to be a constraint. The quantity of TC-lead sediment is small, about 1,500 cy, and the area of the former Kelly Rink site staging area is approximately 35,000 sf.

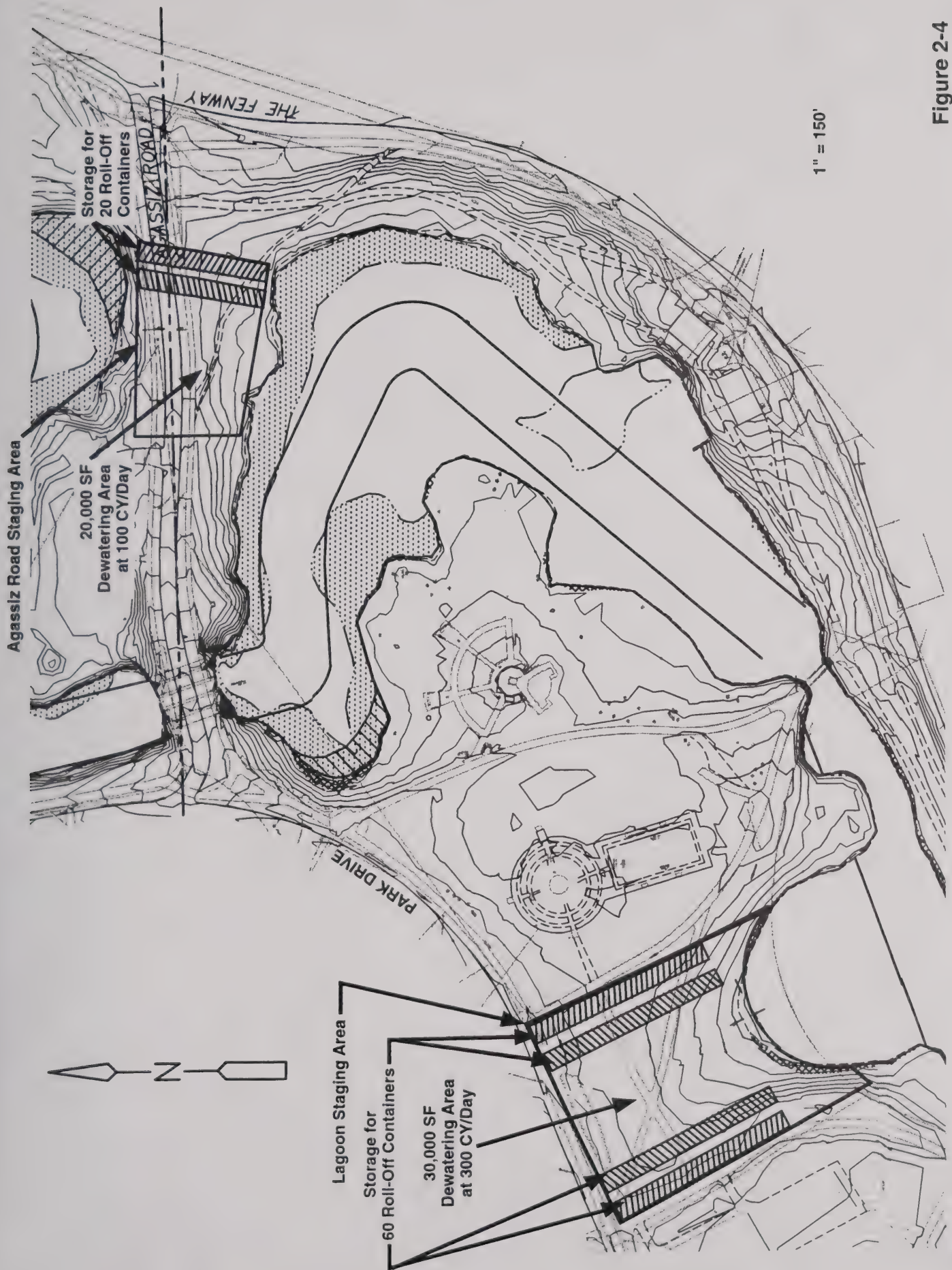


Figure 2-4
Staging Areas for TC-Lead Sediment



Section Three

Section 3

Project Benefits and Impacts

3.1 Introduction

This section identifies and evaluates the potential environmental benefits and impacts of the project proposed in this SFEIR. Effects on hydrology, water quality, aquatic and riparian habitat, and biological resources are discussed. Both short-term (construction) and long-term impacts, benefits, and environmental problems remaining after implementation of the proposed project are described below. Much of the information is taken from the USACE Muddy River Flood Control and Ecosystem Restoration Draft Decision Document and Environmental Assessment (June 2003), hereinafter referred to as the USACE Draft Environmental Assessment or Draft EA.

3.2 Hydrology

3.2.1 Construction Impacts

Daylighting the Muddy River in the Fens may have some short-term impacts on hydrology in the Riverway. Flow capacity through the river segment to be daylighted may be reduced during construction because at least one of the existing culverts and/or the Muddy River Conduit may be inoperable during construction. During low to moderate flows, water could be pumped from the Riverway to the Fens to bypass the work area. During higher flows, however, bypass pumping may not be possible and water surface elevations in the Riverway could increase. Detailed plans to manage water during culvert removal and to minimize flooding in the Riverway will be prepared during final design and the development of plans and specifications for the project.

It is expected that work will progress downstream from Ward's Pond to the Fens. Dredging the Riverway and daylighting the upper Fens will enhance flow conveyance and increase flood stages in the Fens until the flood channel in the Fens is dredged.

Construction activities will have no significant effect on hydrology in Ward's Pond, Willow Pond, or Leverett Pond.

3.2.2 Long-term Effects

One objective of dredging the Riverway and Back Bay Fens sections of the Muddy River is to improve the hydraulic capacity of the system to reduce flooding. Dredging in the Fens will widen and deepen the Muddy River channel, allowing flows to be more quickly conveyed to the Charlesgate section of the Muddy River and to the Lower Charles River Basin. Daylighting and culvert improvements will remove a major restriction between the Fens and Riverway. Finally, dredging in the Riverway will remove several flow restrictions caused by sediment deposits and *Phragmites* encroachment.

For a 20-year event, the proposed project will decrease peak water surface elevations in the Riverway upstream of Park Drive (River Mile 1.94) by several feet and reduce peak water surface elevation in the Fens by about 0.5 feet.

3.3 Water Quality

Implementation of the proposed project will have both long-term benefits and short-term impacts to water quality. The short-term negative impacts to water quality will be mitigated to a large extent by construction mitigation measures. Long-term benefits greatly outweigh adverse short-term impacts.

3.3.1 Construction Impacts

During construction, Muddy River water quality may be affected by staging area runoff, turbidity generated during removal of *Phragmites* root mats and debris, turbidity generated by dredging the sediments, return water from the dredging and the dredged material dewatering processes, and turbidity associated with removing culverted (i.e. daylighting) sections of the Muddy River. A plan will be developed to avoid and minimize adverse effects on water quality. The plan will address erosion and sedimentation control, dewatering treatment, and spill prevention and control, and water quality monitoring. The plan will be reviewed and approved by the MA DEP and the Boston and Brookline Conservation Commissions before construction is allowed to proceed.

3.3.1.1 Staging Area Runoff

Several staging areas will be established in the project area. To provide a workable surface, it is expected that the contractor may place an impermeable geotextile fabric and a layer of crushed stone over the existing ground. Underlying soil will remain essentially undisturbed. Runoff from staging areas will be directed to sedimentation/infiltration basins and/or grassy swales. These measures are very effective at treating runoff, and discharge of sediment or contaminants into surface waters will be minimal.

3.3.1.2 Sediment, *Phragmites* and Debris Removal

Turbidity from dredging will be controlled by silt curtains around the dredge area. Disturbance of sediment during removal of *Phragmites* root mats and large debris (e.g., submerged logs, shopping carts, etc.) will generate turbidity. Work will likely be conducted in stages, with the work areas isolated by silt curtains to contain turbidity.

Mechanical removal of *Phragmites* in the Back Bay Fens and Riverway areas will likely be conducted in two steps. First the stalks will be cut and trucked off site for disposal (composting). The second step will involve the removal of the root mat from the water by a low ground pressure or barge mounted excavator. Substantial turbidity will be generated during excavation of the root mat. Silt curtains along the perimeter of the root mat will be used to minimize transport of turbid water outside of the work area. Material will typically be moved to a staging area and dewatered before being transported off site. At the staging areas, excess water will drain into a sump from

which it will be pumped into the tanks. Tank water will be treated on site prior to discharge back into the Muddy River (see below).

3.3.1.3. Dredging and the Belt Filter Presses Return Water

Most sediment will likely be removed by hydraulic dredging. In some cases, however, mechanical dredging may be more appropriate. The preferred technique will be determined during project design and preparation of plans and specifications.

The hydraulic dredging method includes a dredge that floats on pontoons. Pumps take in water and sediment through a rotating auger that cuts into the sediment. From the dredge, the water-sediment slurry is pumped to a staging area where it is typically treated with a polymer and filtered through a belt filter press. The polymer enhances the separation of water from sediment. The result is a high solid content filter "cake" that is disposed at a suitable offsite facility. Dewatering pressate is collected and treated to remove suspended sediment prior to discharge to surface waters. For the Muddy River project, pressate will be treated on site at staging areas and discharged to the Muddy River. Maximum discharge rate is expected to be about 200 gallons/minute. Discharge standards for the treatment plant will be determined by the MA DEP during the design phase. The proposed discharge standard for total suspended solids (TSS) is 40 mg/l. Frequent testing of discharge water will document compliance with discharge standards.

Elutriate tests conducted on Muddy River sediment indicate that concentrations of dissolved metals in wastewater will be low (see Table 3-1). Given these results and the large volume of receiving waters (Leverett Pond, the Riverway, and/or Fens) relative to the discharge rate of treated wastewater, it is expected that TSS and metal concentrations will return to near background levels within several hundred feet of the discharge point.

3.3.1.4 Turbidity from Daylighting Activities (Back Bay Fens Area)

Daylighting of the Muddy River will involve excavation of fill material, removal of culverts, reconstruction of the Muddy River conduit control structure, grading to re-establish historic channel configuration and an island, and establishment of riparian vegetation. To protect water quality and facilitate construction, most of the work will be conducted in the dry. During construction, the Muddy River will continue to either flow through existing culverts or be pumped from the Riverway to a point downstream from the work area via a bypass pipe. Some turbidity will be generated when the river is first allowed to freely flow through the re-constructed open channel. Placement of washed, coarse-grained material on the channel bottom will minimize the initial flush of sediment downstream. The shoreline will be protected from erosion with matting, coconut fiber rolls, or stone protection (riprap). Riprap will be used only in steeply sloped areas near bridge abutments that cannot be adequately protected from erosion by matting, fiber rolls, or other less intrusive non-structural measures. To minimize erosion and sedimentation from side slopes, embankments will be stabilized with erosion control matting and seeded.

Table 3-1
Results of Elutriate Testing

Analyte	DL	# Detect/N	Concentration (mg/l)		
			Low	High	Mean
Antimony	0.006	0/21	ND	ND	ND
Arsenic	0.005	5/21	ND	0.061	0.007
Beryllium	0.004	0/21	ND	ND	ND
Cadmium	0.005	0/21	ND	ND	ND
Chromium	0.01	0/21	ND	ND	ND
Copper	0.01	1/21	ND	0.03	0.006
Lead	0.01	0/21	ND	ND	ND
Mercury	0.005	0/21	ND	ND	ND
Nickel	0.025	0/21	ND	ND	ND
Selenium	0.005	0/21	ND	ND	ND
Silver	0.007	0/21	ND	ND	ND
Thallium	0.002	0/21	ND	ND	ND
Zinc	0.05	0/21	ND	ND	ND

Notes: Number of samples (N) = 21; To calculate mean, ND = ½ Detection Limit (DL)

Source: USACE Draft Environmental Assessment, June 2003

3.3.2 Long-term Effects

The USACE water quality modeling shows that most of the project area currently fails to meet ambient water quality criteria for dissolved oxygen (DO) during low flow periods. Other water quality problems include high nutrient levels (phosphorus and nitrogen), and failure to meet ambient water quality criteria for metals and coliform bacteria. Under the no action alternative, DO levels are expected to decline throughout the study area over time, despite implementation of a variety of source control measures. Source controls are expected to decrease loading of nutrients and contaminants. Existing sediment, however, will continue to exert a high sediment oxygen demand, support excessive growth of algae and aquatic vegetation, and release contaminants into the water column. Coliform levels are likely to decrease as Boston and Brookline identify and correct additional storm drain cross connections with sanitary sewers.

3.3.2.1 Dissolved Oxygen

The effects of the proposed project on dissolved oxygen levels were based on water quality modeling conducted for the 1998 Muddy River Feasibility Study using the STET water quality model, CE-QUAL-ICM and, where needed, extrapolation of modeled results using engineering judgment. There was no modeling completed for Ward's and Willow Ponds. DO values at these locations were estimated based on measured DO data collected during two different days during August 2001, knowledge of the tributary area, modeling of the rest of the Muddy River system, and engineering judgment.

Results of the analysis are provided in Table 3-2. Implementation of the recommended plan, including maintenance dredging, should maintain DO levels above 5 mg/l throughout most of the project area over the 50-year project life.

Table 3-2
Percent of River Segments Meeting 5.0 mg/L Dissolved Oxygen Standard

	<i>Percent of River Segment with DO < 5.0 mg/L</i>				
<i>Project Year</i>	<i>Fens</i>	<i>Riverway</i>	<i>Leverett Pond</i>	<i>Willow Pond</i>	<i>Ward's Pond</i>
2	0	0	0	0	0
25	10	10	10	10	10
50	25	25	20	20	20

Source: USACE Draft Environmental Assessment, June 2003

Sediment removal will improve DO levels in surface waters in four main ways:

- 1) Dredging exposes well-decomposed (weathered) underlying sediment with lower Sediment Oxygen Demand (SOD),
- 2) Dredging increases the volume of water, reducing the effect of SOD on DO levels,
- 3) Dredging removes nutrient rich surface sediment, reducing plant productivity and oxygen demand exerted by decomposing plant material, and
- 4) Dredging physically removes rooted aquatic macrophytes, reducing plant productivity and oxygen demand exerted by decomposing plant material.

Without maintenance dredging, DO levels in surface waters may drop to pre-existing (without project) conditions in about 20 – 30 years as sediment accumulates and SOD increases. Aggressive implementation of BMPs to reduce sediment and nutrient loading would reduce, but probably not eliminate, the need for future maintenance dredging to meet water quality goals.

3.3.2.2 Nutrients

Dredging will remove surface sediments rich in phosphorus and nitrogen and should substantially reduce dry-weather nutrient levels in surface waters throughout the Muddy River system. Both phosphorus and nitrogen (ammonia) are more readily released in anaerobic conditions, so higher DO levels in surface waters will reduce release of both of these nutrients from sediment. In time, nutrient levels in sediment and surface waters will increase due to loading from non-point sources. Implementation of BMPs to reduce sediment and nutrient loading and periodic maintenance dredging in the future will help maintain lowered nutrient levels over the long-term.

Contaminants

The concentration of metals in surface sediments following dredging will be substantially lower than existing conditions. This will lead to reduced release of metals from sediment and lower levels of metals in surface waters during dry-weather conditions.

Increased DO levels may increase release of zinc, lead, copper and other metals through oxidation of insoluble hydrogen sulfide precipitates. Although oxidation of the sulfides could release metals into the water, it is likely that the metals will be bound by insoluble iron and manganese oxides that form in aerobic conditions. The proposed project could also reduce wet-weather metal concentrations because removal of sediment deposits would reduce re-suspension of metal-rich sediments during storm events. Implementation of BMPs will reduce metal levels in surface waters during wet weather events.

Higher DO levels will promote oxidation of ammonia to nitrate (nitrification) and reduce ammonia levels in surface waters. Similarly, levels of hydrogen sulfide should decline. Dredging should also reduce occurrence of floating oils, which are currently readily released when oil-rich surface sediments are disturbed.

3.4 Sediment Quantity and Quality

3.4.1 Sediment Quantity

The proposed project will remove about 200,000 cubic yards of sediment from the Muddy River as summarized in Table 3-3. Depth of material removed ranges from 2 to 4 feet in most areas and 6 feet at Willow Pond.

Table 3-3
Sediment Volumes and Dredging Depths

Location	Volume Removed (cy)	Depth Removed (ft.)
Back Bay Fens	119,000	4
Riverway	31,000	2
Leverett Pond	29,000	2
Willow Pond	5,000	6
Ward's Pond	16,000	4
Total/Mean	200,000	3.1 (mean)

Source: USACE Environmental Assessment

Following dredging, sediment will gradually begin to re-accumulate. Sediment will accumulate as a result of loading of inorganic or organic matter from storm drains and non-point runoff, organic matter from riparian and wetland vegetation (e.g., leaf fall), and organic matter produced by algae and aquatic plants.

Studies conducted by CDM indicate that, with best management practices (BMPs) in place, sediment depths will not reach existing depths for at least 50 years in Leverett Pond, the Riverway and the majority of the Fens, except for specific areas in the Fens

where existing depths may be reached within 30 years. When fully implemented, storm water BMP will reduce sediment accumulation by about 1/3 over the 50-year project life. Average accumulation over 50 years at 9 locations was estimated at 1.3 feet. The proposed dredging plan for the river will include additional dredging in specific sections to create deeper water areas where sediment will tend to accumulate.

Deepened channel sections are proposed downstream of where sediment is likely to be discharged. Sediment is likely to accumulate most rapidly in Willow Pond, because this small pond receives loading from a large storm water drain (the Chestnut Street drain). Sediment should accumulate very slowly in Ward's Pond. Accumulation of sediment in Ward's Pond will result almost totally from deposition of organic material because no major storm drains discharge to the pond and runoff of sediment from the well-vegetated watershed should be minimal.

3.4.2 Sediment Quality

Sediment tests conducted by the USACE others show that Muddy River sediment contains elevated levels of contaminants, including metals, petroleum hydrocarbons, polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), and pesticides. Elevated contaminant levels result from years of loading from storm drains, combined sewer overflows, non-point source runoff, and atmospheric deposition.

Testing by CDM in 2001 and the USACE show that contaminant levels in underlying sediment are generally lower than concentrations in existing surface sediments. CDM measured levels of metals, PAHs, PCBs, pesticides, and other chemicals at 2 foot intervals ranging from 0-2 feet to 10-12 feet. This information was used to predict the concentration of selected chemicals in sediment exposed by dredging.

The proposed dredging will generally expose sediment with much lower levels of contaminants than in surface sediments (Table 3-4). Lead, cadmium, chromium, mercury, and PAH concentrations will be lower in exposed sediment at all five study areas. Arsenic and PCBs are lower at all locations except Leverett Pond where average concentrations will increase slightly. DDT levels in exposed sediment will be higher than existing surface sediments at Willow Pond, Leverett Pond, and the Riverway. To substantially reduce DDT levels in these areas, an additional 4 feet of sediment would need to be removed from Leverett Pond, two additional feet in the Riverway, and at least 2 additional feet in Willow Pond.

Sediment oxygen demand (SOD) is expected to be substantially reduced by dredging. Exposed sediment will have a high organic content, but low oxygen demand because the organic material is likely to be very well-decomposed and resistant to further decomposition.

Sediment chemistry will gradually change after dredging due to loading from storm drains and other sources and biological activity. Implementation of BMPs will reduce loading somewhat, but given the highly urbanized nature of the watershed, significant loading of many contaminants will likely continue.

Table 3-4: Muddy River Sediment Quality at Depth

Analyte	Sample Depth	Wards	Willow	Leverett	Riverway	Fens
Lead (mg/kg)	Surface	448	433	879	462	893
	0-2	201	545	695	565	694
	2-4	170	-	371	332	352
	4-6	115	112	378	122	460
	6-8	90	34	109	68	154
	8-10	29	-	503	144	40
Arsenic (mg/kg)	Surface	22.6	15.7	13.0	9.0	11.4
	0-2	5.5	17.0	20.1	19.0	16.1
	2-4	ND	-	218.0	139.0	11.8
	4-6	ND	ND	15.7	6.2	12.2
	6-8	ND	ND	9.3	16.5	7.3
	8-10	ND	-	7.1	ND	0.8
Cadmium (mg/kg)	Surface	2.1	1.8	4.7	2.8	5.3
	0-2	0.9	1.2	2.3	3.5	4.9
	2-4	ND	-	1.2	1.6	1.7
	4-6	ND	ND	1.1	0.7	1.7
	6-8	ND	ND	ND	0.3	0.5
	8-10	ND	-	ND	ND	0.1
Chromium (mg/kg)	Surface	37.0	57.0	22.4	74.6	116.0
	0-2	15.5	31.0	71.6	53.7	69.6
	2-4	11.0	-	52.0	52.2	58.2
	4-6	11.6	13.6	40.9	25.1	34.0
	6-8	11.8	13.6	40.9	25.1	27.5
	8-10	26.0	-	27.0	9.3	18.9
Mercury (mg/kg)	Surface	0.65	1.84	0.76	0.65	2.02
	0-2	0.13	0.36	0.73	0.94	1.87
	2-4	0.21	-	0.40	0.53	0.85
	4-6	0.05	0.09	0.45	0.23	1.57
	6-8	0.01	ND	0.14	0.13	0.70
	8-10	0.02	-	0.01	ND	0.45
PAHs (mg/kg)	Surface	30.0	67.4	86.1	179.0	103.0
	0-2	5.8	71.5	52.8	85.1	24.2
	2-4	ND	-	18.9	35.0	10.3
	4-6	1.35	4.9	47.2	24.0	16.0
	6-8	ND	3.0	10.5	7.8	3.9
	8-10	7.5	-	2.0	8.9	1.9
PCBs (ug/kg)	Surface	78.6	140	305	144	893
	0-2	270	65	318	ND	1350
	2-4	416	-	380	ND	370
	4-6	ND	77	152	ND	690
	6-8	ND	ND	14	ND	240
	8-10	ND	-	ND	-	67
Total DDT (ug/kg)	Surface	67	813	607	187	259
	0-2	60	2051	1268	1260	562
	2-4	ND	-	1360	600	101
	4-6	ND	1480	594	60	148
	6-8	ND	2548	87	2	18
	8-10	ND	-	184	-	2

Source: ACOE Environmental Assessment, June 2003

Notes:

1. Surface data from Corps grab samples collected in 1995, 2000, and 2001 studies.
2. All other data from CDM (2001).
3. Shading indicates material below proposed dredging depths.
4. Concentration below detection limit in all samples.
5. "-": no data available.

Concentrations of metals and PAHs in sediment are expected to gradually increase after project construction is complete as loading of these chemicals from storm drains, urban runoff, and atmospheric deposition continues. The concentration of lead in sediment is not expected to reach historic levels since leaded gasoline (the principle historic source) is no longer used. Non-point loading of lead from contaminated urban soils will continue. Concentrations of PAHs are also not expected to reach pre-existing levels. In urban environments, PAHs derive primarily from combustion of petroleum hydrocarbons in cars and trucks. Over the 50-year project life, generation of PAHs should decline as emission controls become more stringent and as vehicles using electric or other low/zero emission technologies become more prevalent. Contaminated urban soils, however, will remain a significant non-point source of PAHs over the long term. Levels of petroleum hydrocarbons in sediment will gradually increase, but should not reach existing levels. Improved regulatory oversight will reduce likelihood of a major release of fuel oil, such as the historic discharge from the Chestnut Street Drain to Willow Pond. Implementation of BMPs and reduced reliance on the internal combustion engine will also reduce future loading. Levels of PCBs, DDT, and chlordane in sediment should decrease over time. Use of these chemicals in the United States has been banned since the 1970s or 1980s, and no significant future loading from the watershed is expected. In time, new sediment deposits will mix with and dilute the concentration of these chemicals in surface sediment. As organic material accumulates SOD will increase and likely return to pre-existing levels in 20 to 30 years.

The effects of improved sediment quality on biological resources are discussed in Section 3.5.

3.5 Biological Resources

The ecosystem restoration component of the proposed project will enhance fish, wildlife, and plant communities in the Muddy River corridor. Benefits will result from increased acreage and volume of aquatic habitat, improved sediment quality, improved water quality, elimination of *Phragmites* from riparian and wetland habitats, and planting of a more diverse plant community along the river. The long-term benefits to fish, wildlife, and plant communities will outweigh short-term adverse impacts of project construction.

Both the USFWS and Massachusetts Division of Fish and Wildlife (MDFW) believe that the project will enhance fish and wildlife habitats in the project area.

3.5.1 Habitat

Most long-term habitat changes will occur in the Fens and Riverway. The proposed project includes daylighting about 700 feet of the Muddy River in the Fens. This will create about 1.3 acres of aquatic habitat and 0.8 acres of riparian habitat, including a small island. Restoration of the historic 1927 shoreline in the Fens will convert another 0.9 acres of upland park to aquatic habitat.

Overall, there will be a net gain of 8 acres of open water habitat (Table 3-5). About 7.2 acres of emergent wetland, including 5.8 acres vegetated with *Phragmites*, will be

dredged. This includes 3.5 acres of *Phragmites* in the Fens and 2.3 acres of *Phragmites* in the Riverway. Most of the other emergent wetland lost is fringe wetland along the Fens, Riverway, and Leverett Pond shorelines. About 0.4 acres of riparian habitat dominated by *Phragmites* in the Riverway will be converted to forest-shrub habitat.

Table 3-5
Effects of the Proposed Project on Habitat

Habitat Type	Acres	
	Existing	With Project
Aquatic/Wetland Habitat		
Open Water	30.1	38.1
<i>Phragmites</i>	5.8	0
Herbaceous	1.4	2.0
Herbaceous/Scrub-Shrub	1.7	1.7
Forest/Scrub-Shrub	1.3	1.1
Sandbar	0.3	0
Subtotal	40.6	42.9
Upland Habitat		
Forest-Shrub	38.6	39.6
Herbaceous or Grass	16.1	16.0
<i>Phragmites</i>	0.4	0
Herbaceous/Shrub	1.3	1.3
Urban Park	64.3	61.5
Subtotal	120.7	118.4
Total	161.3	161.3

Source: USACE Draft Environmental Assessment, June 2003

The only other noteworthy habitat alterations are conversion of a few thousand square feet of emergent wetland in Willow Pond to open water and elimination of the Leverett Pond sand island.

Impacts to emergent wetland result largely from the ecosystem restoration plan. About 0.7 acres of emergent wetland in the Fens (mostly *Phragmites*) and 0.5 acres of *Phragmites* in the Riverway will be removed for flood control improvements. To mitigate for loss of emergent wetland, 3.5 acres of emergent wetland will be restored, including 2 acres in the Fens and 1.5 acres along the Riverway, Leverett Pond, and Willow Pond shorelines.

Removal of the sediment will nearly double normal water depth at all locations, except Willow Pond, where depth will increase from about 1 foot to 7 feet. The total volume of aquatic (open water) habitat in the Muddy River system will increase from about 110 to 230 acre-feet.

3.5.2 Benthic Invertebrates

3.5.2.1 Construction Impacts

The benthic invertebrate community includes a wide array of organisms living in close association with the sediments. Many of these organisms burrow into sediments, while others live at the sediment-water interface. Dredging will remove surface sediment and destroy the existing benthic community throughout most of the project area. Some organisms will escape the dredge and survive to re-colonize newly exposed sediment. Because dredging will occur over several years, the entire area will not be dredged at once and re-colonization from undisturbed areas will occur. Recruitment from areas that will not be dredged at all, including emergent habitat in Ward's Pond, Spring Pond, Babbling Brook, and Charlesgate will also occur. Redevelopment of the benthic community will occur over several years, with improved sediment quality ultimately resulting in a more diverse and productive benthic community (see below).

3.5.2.2 Long-term Effects

Due to their direct exposure to surface sediments, benthic invertebrates are highly susceptible to effects of sediment-associated contaminants. An ecological weight of evidence risk assessment conducted for this study indicates that the existing benthic community is likely to be severely degraded at all locations except Ward's Pond. Sediment quality guidelines to protect aquatic life, results of toxicity testing, and benthic community analysis all indicate that the benthic community is degraded. Improved sediment quality following dredging should result in a more diverse and productive benthic community at Willow Pond, Leverett Pond, the Riverway, and the Back Bay Fens. Over the 50-year project life, habitat modeling indicates about a 30 percent gain in benthic habitat quality habitat units (HUs). Sediment quality will decline over time and without maintenance dredging, benthic HUs will increase by only about 20 percent over the 50-year project life.

3.5.3 Fish

3.5.3.1 Construction Impacts

At most locations, the active work area affected by dredging at any time will be a small portion of the entire area. This will allow fish to largely avoid the dredge, using the remaining area as a refuge. Some fish, however, may be entrained by the hydraulic dredge or bucket dredge and lost. Bottom-dwelling species such as bullhead and carp are most at risk. Fish remaining near the work area will also be exposed to elevated levels of suspended sediment during dredging. Silt curtains will limit the aerial extent of this impact and no significant mortality from exposure to elevated suspended sediment levels is expected. With construction sequencing and use of silt curtains, no significant impacts on migration of adult or juvenile blueback herring are expected. At no time will the entire river channel be blocked. Fish will have the most difficulty

avoiding dredge impacts at Willow Pond, which is less than an acre in size. Although some individuals may be lost, construction should not eliminate any fish populations from the Muddy River. Possible effects on a state-listed rare fish, the Threespine Stickleback, which inhabits Spring Pond and a portion of Willow Pond, are discussed in Section 11.

3.5.3.3 Long-term Effects

Fish communities in the project area will benefit from improved water quality, sediment quality, increased habitat area, and improved physical habitat quality. Each of these factors is discussed below.

Water Quality - Without the project, DO concentration is expected to be below 5.0 mg/l, the US EPA ambient water quality criteria, at all locations, with the most severe conditions occurring in the Fens and the Riverway. Implementation of the proposed project will elevate and maintain adequate DO levels throughout the system over the 50-year project life. Adequate DO concentration is a prerequisite for survival and growth of fish and aquatic invertebrates. The 5.0 mg/l DO criteria protects early fish life stages (embryonic, larval stages, and juveniles to 30-days post hatching). Failure to adequately protect early life stages may cause a "bottleneck" which would limit the development of the fishery, even if conditions were otherwise favorable for adult fish. Improved DO may have the greatest effect in the Riverway, which has an extremely degraded fishery dominated almost exclusively by common carp. Species diversity would likely improve, with species such as sunfish, largemouth bass, perch, and bullhead becoming more abundant. Improved DO in the Fens would enhance conditions for species such as perch and largemouth bass which are less tolerant to low DO than the current dominants, carp and golden shiner.

Sediment Quality - Dredging will reduce exposure of fish to contaminated sediment. Anecdotal observations reported by LEC (M. Raymond, pers. commun.) indicate fish in the Muddy River may have elevated incidence of external abnormalities. Elsewhere, similar abnormalities in fish are often correlated with poor sediment quality, particularly elevated concentrations of PAHs. Dredging will substantially reduce PAH levels in sediment and thus may reduce development of abnormalities in fish. Dredging will reduce PCB levels in sediment in Ward's Pond, Willow Pond, the Riverway, and the Fens, and should reduce PCB body burdens in fish. Modeling indicates the slight increase in PCB levels in Leverett Pond sediment will slightly increase PCB concentrations in fish. Predicted PCB concentrations in fish are well below 0.2 ppm at all locations.

Improved sediment quality will also enhance productivity and diversity of the benthic invertebrate community. Benthic feeding fish may benefit from increased benthic productivity.

Habitat Area and Physical Habitat Quality - The recommended plan will increase open water habitat from 30 to 38 acres, and restore a 700-foot section of the Muddy River. The volume of surface water habitat will approximately double in most areas. Average

depth of the Fens ponds will increase from about 2 to 6 feet. In Willow Pond, maximum depth will increase from about 1 foot to 7 feet. This will greatly improve fish habitat and provide depth needed for fish to overwinter in the pond. Expansion of physical habitat should correspond with an increase in fish biomass and productivity.

Lack of underwater cover reduces fish habitat quality in Leverett Pond, the Riverway and Back Bay Fens. Installation of boulders in Leverett Pond, the Riverway, daylighted sections of the Muddy River, and Fens will enhance underwater cover. The boulders will also compensate for removal of submerged logs, shopping carts, and other underwater debris by the dredging. Backwater areas and scour holes created by deflectors in the Riverway and daylighted sections of the Muddy River will also improve fish habitat.

3.5.3.4 Other Effects

Removal of fanwort may adversely affect fish habitat in the Fens. Although organic matter produced by the dense beds contributes to low DO levels, the fanwort also provides fish cover, food and habitat for invertebrate prey. Studies suggest that optimal cover of submerged wetland to support fisheries is 25 – 50 percent less than current fanwort cover in the Northern Fens Basin (75 percent). In time, fanwort and other aquatic vegetation will re-colonize dredged areas and provide adequate fish habitat. Periodic weed control and maintenance dredging should, however, prevent redevelopment of dense beds that threaten to degrade water quality.

Emergent wetland also provides fish habitat, particularly for juvenile fish. Removal of *Phragmites* and other emergent vegetation in the Fens will reduce juvenile fish habitat. This impact is limited since some emergent wetland in the Fens is intermittently flooded or floating and is normally without standing water. Restoration of about 2 acres of emergent wetland in the Fens, ranging in depth from 0 to 2 feet, will mitigate for lost juvenile fish habitat.

Overall, the recommended plan will have a positive effect on the Muddy River resident warmwater fish community, improving both habitat quantity and quality. Over the 50-year project life for the project, a HEP Analysis conducted by the USACE calculated a 5-fold gain in fish habitat units. The benefits result from both increased fish habitat area and higher predicted DO concentrations. Without maintenance dredging, DO levels will gradually decline and the benefits of the project decrease by about 60 percent.

The project should also benefit the small population of blueback herring that spawns in the river. Daylighting of a 700-foot section in the Fens should enhance herring migration to spawning areas in Leverett Pond. Restoration of Babbling Brook should help aerate herring spawning habitat (bluebacks currently spawn near the culverted outlet of the brook). Improved sediment quality in Leverett Pond should also enhance growth and survival of juvenile herring. Improved DO levels and sediment quality at Willow Pond may benefit the Threespine Stickleback, a state-listed threatened species (see Section 11).

3.6 Vegetation

3.6.1 Algae

Dredging will reduce the likelihood of phytoplankton blooms in the Fens, Leverett Pond and Ward's Pond by reducing nutrient (in particular, phosphorus) concentrations in the water. However, benefits would decline over time as nutrient loading from storm drains and non-point sources increased nutrient levels in the system. Dredging will reduce growth of mat-forming filamentous algae by reducing nutrient levels, deepening the substrate to below the euphotic zone, and reducing growth of aquatic plants that provide a substrate for algal growth. Reduction in mat-forming algae will be greatest in Ward's Pond, Willow Pond and the Fens.

3.6.2 Submerged Aquatic Vegetation

Dredging will remove most existing submerged vegetation from the Muddy River system. Growth of submerged vegetation is most pronounced in the Northern Fens Basin where percent cover of fanwort is currently about 75 percent and Ward's Pond where cover of water lilies and pond weeds is about 10 percent. Little submerged vegetation grows in the Fens, Riverway, or Willow Pond.

Fanwort is an undesirable invasive plant and its control in the Fens is a project objective. Dredging is unlikely to eradicate fanwort from the system because both seeds and viable propagules will remain to re-colonize areas in the river. Most of the Fens will be dredged to a depth of 4 - 6 feet, too shallow to prevent re-colonization by fanwort and other submerged plants. Some re-growth of submerged vegetation is desirable for fish habitat (25 - 50 percent cover). If a dense stand of fanwort redevelops, an aquatic herbicide such as SONAR may be used to control it.

Ward's Pond will be dredged to a depth of about 8 - 10 feet. This will preclude growth of most submerged plants. A shallow underwater mound may be left in the pond to encourage re-growth of some submerged vegetation.

3.6.3 Phragmites and Other Emergent Vegetation

3.6.3.1 Phragmites

The proposed project will eradicate 6.2 acres of *Phragmites* present in the Riverway and Fens by dredging or cutting with concurrent application of a glyphosate herbicide (RODEO or Roundup). In wetland areas, *Phragmites* and associated contaminated sediment will be removed by excavation. In riparian areas that are not being excavated to remove sediment, *Phragmites* will be controlled initially by cutting and herbicide (RODEO) application using a backpack sprayer hand sprayer or painted on leaves or cut stems with a brush or sponge. Herbicide will be applied only under low to no wind conditions to minimize drift and incidental application on adjacent vegetation. Some shoots will survive the initial control measures, and follow-up application will be required for several years to completely eradicate *Phragmites* from the Fens and Riverway. Follow-up control will rely on cutting and targeted herbicide application. Stems will be cut and painted or injected with RODEO or Roundup. This technique allows precise treatment of individual plants with no effect on adjacent vegetation.

Use of cutting and RODEO to eradicate *Phragmites* in riparian areas along the Riverway is the least damaging effective control method. Use of cutting and black plastic shading to eradicate *Phragmites* proved ineffective in experimental studies conducted for the Boston Parks Department (Cortell, 1996). Removal of *Phragmites* from riparian areas could be accomplished by excavation. This approach would require removal of hundreds of cubic yards of soil to extract deep growing rhizomes (4 ft. or more). Excavation would disrupt root systems of some adjacent trees and shrubs, possibly killing them.

Use of RODEO will have no adverse environmental effects. It is approved for use in and near surface waters, has low toxicity, degrades quickly after use, and does not bioaccumulate. RODEO is routinely used to control *Phragmites* by organizations such as The Nature Conservancy, MA Natural Heritage Program, and the New England Wildflower Society. All work would be supervised by a Massachusetts registered pesticide applicator.

Wetland areas vegetated with *Phragmites* will be largely replaced with open water habitat. In the Fens, loss of emergent wetland will be compensated by creation of about 2 acres of emergent wetland planted with a variety of native, non-invasive emergent plants. Species selected will be consistent with historic landscape restoration objectives. Emergents will be planted in a 3-6 foot wide strip along most of the shoreline. In several areas larger stands (5,000 to 12,000 sf) of emergent vegetation will be planted. The resulting wetlands will have higher plant diversity than the existing *Phragmites* stands. In riparian areas along the Riverway, *Phragmites* will be replaced with a more diverse riparian forest/shrub community. See Section 5 for further discussion.

3.6.3.2 Other Emergent Vegetation

Dredging will remove a 15,000 square foot cattail stand in the Fens and about 10,000 square feet of emergent vegetation in Willow Pond. Emergent wetlands growing along the shoreline in the Riverway, Fens, and Leverett Pond will also be disturbed. Almost all emergent vegetation growing around Ward's Pond will be preserved.

Loss of emergent wetland in Olmsted Park will be compensated by plantings. In Leverett Pond, wetland vegetation will be planted along the shoreline. Efforts will be made to save existing emergent shoreline vegetation to the maximum extent possible. In the Riverway and Willow Pond, a 3 to 6-foot wide zone will be planted along the shoreline for its entire length (except under bridges). A variety of non-invasive emergent plants, with good wildlife habitat value and consistent with the Olmsted Plan will be established. In some areas, placement of backfill (manufactured wetland soil) may be needed to reestablish shoreline vegetation.

3.6.4 Riparian and Terrestrial Vegetation

Dredging will require some clearing of existing riparian vegetation to gain access to the river. Access points will be selected to avoid and minimize removal of existing trees and shrubs to the extent practicable. Cutting of larger trees (> 4" diameter at breast height, [DBH]) will be avoided wherever possible. Appropriate trees and shrubs will be

planted to replace any unavoidable removal or damage to woody vegetation. Many shrubs that are cut will not need to be replanted because they can re-grow from the cut stems.

To avoid damage to the root zone of larger trees, no heavy equipment will be allowed to operate inside the drip zone (canopy edge) of the trees without matting to prevent soil compaction. Special care will be taken to avoid any loss or damage to heritage trees (i.e., trees > 32 inch DBH).

Staging areas will be sited exclusively in grassed areas and should not adversely affect trees or shrubs. Turf will be restored as soon as possible after work within the staging areas cease.

Daylighting of the river in the Fens will replace approximately 1.9 acres of grass (turf) with open water and approximately 0.8 acres of new forest/shrub riparian habitat. Restored riparian areas will be seeded with a variety of native herbs and grasses (conservation mix) and planted with native, non-invasive trees and shrubs with good wildlife habitat value. Species selection will be consistent with historic landscape restoration objectives.

3.7 Wildlife

3.7.1 Construction Impacts

Clearing of vegetation, other construction activities, and noise will disturb mammals, waterfowl and songbirds near active work areas. Most animals will relocate to nearby undisturbed habitat and not be harmed. During May through July, some active nests may be abandoned or destroyed by construction. During dredging activities, some turtles and amphibians may be entrained by the hydraulic or bucket dredges and lost. Bottom dwelling species like mud turtle are most at risk. The possibility of entrainment will be greatest in early spring and late fall when turtles and amphibians are lethargic or in hibernation and are less able to avoid the dredge. During the rest of the construction season, most turtles and amphibians should be able to avoid the active work area. Construction activities should not result in the loss of local populations of any wildlife species from the Muddy River corridor.

3.7.2 Long-term Effects

In the Fens, loss of about 3.7 acres emergent wetland (3.5 acres *Phragmites*) will have an adverse affect on songbirds and other wildlife that use the *Phragmites* stands for nesting, cover, and foraging habitat. The impact will be mitigated by establishing about 2 acres of emergent wetland planted with higher wildlife value food plants such as bureed, pickerelweed, and arrowweed. Planting high wildlife value shrubs along the shoreline will also mitigate for lost emergent wetland habitat. The small stands of emergent wetland created, however, will have less cover value than the existing *Phragmites* stands, and provide wildlife less of a buffer from human activities.

In the Riverway, dredging will eliminate about 2.3 acres of emergent wetland dominated by *Phragmites*. This impact will be mitigated by planting higher value wildlife plants (emergents and shrubs) along the shoreline. Loss of cover provided by *Phragmites* in the Riverway will not adversely affect wildlife since adjacent wooded riparian habitat will provide adequate cover and a buffer from human activities.

Daylighting the river in the Fens will create about 0.8 acres of new forest/shrub riparian wildlife habitat, including a small island. Dredging will also restore an historic island in the Riverway. In urban areas, islands can provide nesting birds protection from predators such as feral cats and striped skunk. This will establish new habitat where essentially none is provided by the existing open lawn area.

Dredging will eliminate mudflat habitat in the Fens, Riverway and Leverett Pond. This may have an adverse effect on foraging shorebirds, but may reduce occurrence of outbreaks of avian botulism.

The project will remove logs and other debris that impede floodflow through the Fens and Riverway. The value of this debris as basking sites for turtles and amphibians will be lost. To mitigate for this impact, habitat logs will be installed in backwater areas where they will provide basking sites but not adversely affect floodflow.

Food chain modeling indicates that contaminants in sediment may continue to pose a risk to piscivorous wildlife and wetland dependant birds after construction. Contaminants of concern are lead, zinc, DDT, and mercury. Dredging generally decreases risk posed by lead and zinc, but increases risk posed by DDT and mercury in some locations. Risk posed by DDT increases at Willow Pond, Leverett Pond, and the Riverway because dredging exposes sediment with higher DDT levels than existing. Risk posed by mercury increases slightly in the Fens. Use of manufactured wetland soils with low contaminant levels to construct replacement wetlands in the Fens will reduce risk of wildlife. After construction, PCBs should pose no risk to wildlife in the Fens or elsewhere in the Muddy River system.

Overall, HEP modeling completed by the USACE indicates that the proposed project will increase wildlife habitat units from 11.7 to 12.2. Loss of emergent habitat provided by *Phragmites* is entirely mitigated by replacement emergent wetland and wildlife habitat established in daylighted areas in the Fens.

Wildlife inhabiting parkland near the Muddy River may also benefit from aquatic habitat restoration. This parkland includes approximately 40 acres of forested habitat and 65 acres of savannah-like landscaped park. Wildlife inhabiting these areas are dependent to varying degrees on the Muddy River for breeding habitat, food, and water. Upland and migratory birds that forage in riparian or wetland habitat for seeds and berries will benefit from replacement of *Phragmites* with more diverse, productive plant communities. Situated within a highly urban coastal area, the entire park system provides an important resting and feeding area for songbirds and waterfowl migrating along the New England coast.

3.7.3 Protected Species

The proposed project is not anticipated to have any significant adverse impact on any federally protected species occurring in the Muddy River study area. However, the Threespine Stickleback, a state-listed threatened fish species occurs in Spring Pond, its outlet stream, and a small ponded area within Willow Pond. The Massachusetts Natural Heritage and Endangered Species Program (NHESP) has been involved with the review of this project and supports the project provided certain measures are taken to protect the stickleback during construction and to assure long-term viability of the Spring Pool population. These measures include relocation of sticklebacks in Willow Pond before dredging, timing construction to minimize effects on stickleback, restoring the buffer zone around Spring Pond, removal of accumulated sediment from the pond, and measures to reduce sediment and nutrient loading to the pond for the long-term.

3.8 Cultural Environment

3.8.1 Historic Resources

3.8.1.1 Construction Impacts

Historic resources in the project area are described in Section 6 of the DEIR. During construction, the historic features and vegetation will be protected with chain link fencing, as needed, including gated entries to the features to exclude construction activities. Protection fencing will remain in place until final completion of all proposed adjacent work and any disturbed areas will be restored in kind as required. Entrance and egress to these features will be signed to control, direct, and protect pedestrian and vehicular access. Alteration of the shoreline is limited to selected points of entry for the dredging operations and removal of invasive species. These areas will be restored upon completion of shoreline restoration and *Phragmites* removal. All heritage trees will be protected to their drip line, pruned, and fertilized. Bridges where dredging will occur will have limits in the specifications so dredging will not disturb footing structures.

3.8.1.2 Long-Term Effects

The project will provide historic landscape, park, and waterbody improvements as described in detail in Section 6 of the DEIR. Improvements include the rehabilitation of the path system in the area filled above The Fens Bridge and the entire path system in the Sears parking area when these areas are daylighted. The historic path on the Boston side near Boylston Street and The Riverway will be restored when the shoreline and beach are restored. The culvert bridge between Spring Pond and Willow Pond will be restored as will the adjacent rock placement on the banks of Willow Pond.

Plans for the Carlton Street Footbridge and Back Bay Yard are described in Section 10 of this SFEIR.

3.8.2 Land Use

The current land use will be impacted during construction activity by increased traffic, noise, and dust. The presence of staging areas will result in minor disturbances to use of the parkland. However, there will be no permanent or long-term impacts to land use.

3.8.3 Recreation

3.8.3.1 Construction Impacts

Recreation in this area historically and currently has been heavily used for both active and passive including walking, sunbathing, bicycling, dog walking, etc. The use of some active and passive areas will be restricted at different times during construction so entrance and egress to the area will be signed to control, direct, and protect pedestrian access during construction.

The northerly softball field near Leverett Pond (the field closes to the water) will be closed while being used as part of staging area. The southerly little league field will be fenced off from the staging area and kept in operation during construction.

3.8.3.2 Long-Term Effects

As discussed in more detail in Section 6.4.3.3 of the DEIR, the northerly field will be re-oriented away from Leverett Pond and rebuilt after construction is complete. The re-oriented field will be rebuilt with a grass infield, as opposed to the current soil mix, to reduce sediment runoff problems that currently exist. This will result in the restoration of the historic view of Leverett Pond since the backstop will no longer be at the Pond and the view from the outfield will be more in line with the historic view of a grassed meadow. The proposed project will not alter the current active and passive recreation.

3.8.4 Pedestrian Access

Pedestrian access during construction will be obstructed in several areas, especially adjacent to staging areas. In most cases, access will be maintained with temporary pathways. Safety barriers and signage will direct pedestrians around construction activities. Refer to Section 6 of the DEIR.

3.9 Traffic

3.9.1 Construction Impacts

This project will add traffic to both regional roadways and local roadways during construction. The majority of traffic generated by the project can be attributed to hauling dried material from staging areas and culver construction. Ingress and egress to staging areas will be limited during rush hours to minimize traffic impacts. See Section 6 of the DEIR for a detailed discussion on construction-related traffic impacts.

3.9.2 Long-term Effects

The project will have no long-term impacts on traffic in the area.

3.10 Summary of Environmental Consequences of the Proposed Project

Environmental benefits of the recommended plan are summarized in Table 3-6. Adverse effects are summarized in Table 3-7.

**Table 3-6
Benefits of the Recommended Plan**

Resource	Benefit	Location				
		Ward's	Willow	Leverett	Riverway	Fens
Hydrology	<ul style="list-style-type: none"> Significant increase in hydraulic capacity of the river. 				•	•
Economics	<ul style="list-style-type: none"> Significant reduction in flood losses. 			•	•	•
Water Quality	<ul style="list-style-type: none"> Dissolved oxygen levels increase to consistently meet water quality criteria. Improved dry weather water quality (reduced metal, ammonia levels). Reduced nutrient levels. 	•	•	•	•	•
Sediment Quality	<ul style="list-style-type: none"> Reduced sediment oxygen demand. Reduced levels of metals, petroleum hydrocarbons, PAHs, and PCBs. 	•	•	•	•	•
Aquatic Habitat and Riparian Habitat	<ul style="list-style-type: none"> Daylighting, removal of storm drain sediment deposits and <i>Phragmites</i> (Riverway, Fens) restores over 8 acres of open water habitat. Daylighting adds new riparian habitat in Fens. 		•	•	•	•
Wetland and Aquatic Vegetation	<ul style="list-style-type: none"> Elimination of <i>Phragmites</i> allows restoration of more diverse emergent and riparian communities. Removal of fanwort allows restoration of more diverse submerged aquatic community. 				•	•

Table 3-6 (continued)
Benefits of the Recommended Plan

Resource	Benefit	Location				
		Ward's	Willow	Leverett	Riverway	Fens
Recreation and Aesthetics	<ul style="list-style-type: none"> Improved recreational warmwater fishery. Public health advisory (PCBs) against eating fish may be lifted. Reduced odor problems. Removal of <i>Phragmites</i> (Riverway, Fens), shoal areas (Leverett Pond, Willow Pond, Fens) and algal mats (Ward's Pond, Willow Pond, Fens) improves aesthetics. 			•	•	•
Public Safety	<ul style="list-style-type: none"> <i>Phragmites</i> removal improves public safety and reduces risk of wildfire. Reduced human exposure to contaminated sediment (skin contact, accidental ingestion). 			•	•	•
Historic/Cultural Resources	<ul style="list-style-type: none"> Preservation and restoration of the historic park shoreline in construction areas. Restoration (daylighting) of two sections (700 linear feet) of river in the Upper Fens. Restoration of scenic qualities and aesthetics of historic park system. 	•	•	•	•	•

Source: USACE Draft Environmental Assessment, June 2003

Table 3-7
Adverse Impacts of the Recommended Plan

Resource	Adverse Impact	Location				
		Ward's	Willow	Leverett	Riverway	Fens
Hydrology	<ul style="list-style-type: none"> • Temporary diversion of river flows during dredging. 				•	•
Water and Sediment Quality	<ul style="list-style-type: none"> • Short-term increase in suspended solids during channel restoration and/or dredging. 	•	•	•	•	•
Aquatic Habitat and Riparian Habitat	<ul style="list-style-type: none"> • Minor short-term increase in suspended solids during channel restoration and/or dredging. 	•	•	•	•	•
Aquatic Life	<ul style="list-style-type: none"> • Loss of benthic community (dominated by pollution-tolerant organisms) and impact to some fish species during dredging activities. 	•	•	•	•	•
Wetland and Aquatic Vegetation	<ul style="list-style-type: none"> • Short-term bank disturbance during construction activities. 	•	•	•	•	•
Wildlife	<ul style="list-style-type: none"> • Short-term loss of cover and resting for some species of birds due to Phragmites removal. • Dredging during winter hibernation resulting in the loss of amphibian and reptile species. 				•	•
Aesthetics and Recreation	<ul style="list-style-type: none"> • Minor disturbance to parkland during construction operations (i.e., staging areas, dredging and truck traffic). 	•	•	•	•	•

Source: USACE Draft Environmental Assessment, June 2003

4

Section
Four

Section 4

Alternatives

The MEPA Certificate on the FEIR requires investigation of alternatives to address the potential impacts of the proposed project and states the need for additional information to meet the regulatory standards of two aspects of the project: wetlands/water quality and project management structure. The MEPA Certificate also indicates that the additional alternatives analyses may be incorporated into the specific sections in which they are relevant and, therefore, a separate stand-alone alternatives analysis is not necessary. Therefore, below is an overview of the two issues relating to alternatives as presented in the MEPA Certificate and comment letters, with an indication of the appropriate section of the SFEIR for discussion:

- The MEPA Certificate requires that alternatives analyses necessary for DEP to evaluate any requests for variances from Wetland Protection Act regulations be included in the SFEIR. Other commenters noted that portions of the dredging work do not meet the performance standards contained in 310 CMR 10.00 and will require a wetlands variance.

Section 5 of this SFEIR presents a discussion of alternatives and provides justification for the project to be permitted as a limited project. Therefore, the variance provisions would not apply. See Section 5 for further discussion.

- The MEPA Certificate requires that alternative management structures be included in the SFEIR, including the proponent's preferred management structure, the "Rowe cabinet structure," and the alternatives proposed by the Emerald Necklace Citizens Advisory Committee.

Since issuance of the FEIR Certificate, there have been discussions with MEPA and the Maintenance and Management Oversight Committee (MMOC) regarding the need to present alternatives in the SFEIR. MEPA and MMOC agreed that such a presentation was unnecessary because the project proponents are currently working on implementation and organization of the MMOC. See Section 8 for further discussion and a summary of comments received during the public comment period related to the project's management structure.

5

Section Five

Section 5

Wetlands

5.1 MEPA Certificate and FEIR Comments

Both MEPA and DEP requested that more information be provided in the SFEIR regarding wetland resource area impacts. Specific comments or issues relative to wetland resource areas, the interests and compliance with the Massachusetts Wetlands Protection Act (the Act, MGL c.131, s.40) and Regulations (310 CMR 10.00) are as follows:

- Re-evaluate the need for “bank-to-bank” dredging in the Riverway, and document that this work is approvable as either a limited project or can meet the criteria for a variance from the Act.
- Provide wetland replication in the Ponds (or Olmsted Park) section of the river for wetland losses in that area, rather than providing replication in the Fens for losses in Olmsted Park.
- Address the need for deepened channel sections throughout the river corridor, and the ability to permit these deepened channel sections as either a limited project or variance.
- Quantify the extent of wetland loss, replication and restoration.
- Regarding *Phragmites* removal, address the loss of shoreline stabilization function resulting from *Phragmites* removal and methods to stabilize banks and land under water where *Phragmites* removal will occur.
- Examine alternatives to bank-to-bank dredging in the three ponds.
- Pursue wetland mitigation along daylighted sections of the river in the Back Bay Fens.
- Discuss the ability of the proposed activities to qualify for a variance or be approved as limited project activities as described in the Regulations. (Note that subsequent to the issuance of the Certificate on the FEIR, the project proponents have met with DEP several times about project provisions as presented in this SFEIR. As a result of those discussions, the proponents believe that the project qualifies as a limited project.)

5.2 Project Overview and Summary of Work in Wetlands

The proposed Muddy River Flood Control, Water Quality and Habitat Enhancement and Historic Preservation Project (the Project) described in this SFEIR consists primarily of channel improvements to protect against a flood with a 20-year return

frequency, and environmental restoration. These improvements include channel dredging, removal of undersized culverts, constructing two new culverts, and daylighting two culverted sections (about 700 linear feet) of the Muddy River to alleviate flooding. The Project also includes environmental restoration by environmental dredging (i.e. to remove contaminated sediments) in the Back Bay Fens, the Riverway, and Leverett, Willow and Ward's Ponds and eradicating *Phragmites* from wetland and riparian areas along with related re-vegetation using native species consistent with the Olmsted design. The locations of these features of the project are shown on Figure 5-1.

Components of the proposed project include those that serve a flood control function (interests of flood control and storm damage prevention) only, those that provide environmental restoration (interests of fisheries and wildlife habitat and prevention of pollution) only, and those that provide both. The following describes each project feature and its purpose. The project is described for each river section in Section 5.4.

- Dredging in the Fens to restore the historic 1920s river banks will include the dredging necessary for flood conveyance and additional dredging for environmental restoration. The cross sections on Figure 5-8 define each area. Within the Fens, about 53,000 cubic yards of sediment and *Phragmites* will be removed for flood control and about 66,000 cubic yards will be removed for environmental restoration.
- Daylighting two sections of the Muddy River within the upper Fens area, i.e., culverts will be removed to return the river to open-channel flow. The first is an approximately 360-foot-long section upstream of the culvert under Avenue Louis Pasteur (Fens bridge). The second is an approximately 330-foot-long section at the former Sears parking lot. In both locations, existing twin 6-foot-diameter culverts will be removed. Returning these sections to open-channel flow will allow these sections to convey much higher flood flows, as well as provide for considerable environmental and historic restoration. Improvements in this area also include the restoration of the Fens bridge.
- Replacing the existing culverts under Brookline Avenue with a 10' by 24-foot arched culvert approximately 330 feet long to increase flood conveyance capacity. Included with this culvert is an overflow connection to the underground gatehouse at the entrance to the Muddy River Conduit.
- Existing twin 6-foot-diameter culverts under the rotary and access roads at the downstream end of the Riverway will remain but be supplemented with a 10' by 16-foot arched culvert. This new culvert is required for flood control.

- Removing over 31,000 cubic yards of accumulated sediment from the Riverway segment for both flood control and environmental restoration (see Table 5-3). Dredging of nearly 7,000 cubic yards is needed to remove flow restrictions at five areas along the Riverway - two areas are upstream from Brookline Avenue, one is located on the Boston side of the island upstream from Netherlands Road, the fourth is located about 900 feet downstream from the Longwood Avenue bridge, and the fifth is at the downstream end of the Riverway. The balance of dredging in the Riverway is needed for environmental restoration.
- Dredging at Leverett Pond includes removing nearly 29,000 cubic yards of accumulated sediment. The majority of this is for environmental restoration with about 1,000 cubic yards being removed to improve flood flow characteristics at the outlet of Village Brook.
- Dredging approximately 5,000 cubic yards of sediment from Willow Pond and approximately 16,000 cubic yards from Ward's Pond for environmental restoration purposes only.
- Providing additional flood-proofing at the Boston Fire Department Fire Control Center in the Fens.
- Eradicating *Phragmites* from the Fens and Riverway through dredging to restore the 1920s shoreline and cutting and applying herbicides to the stalks that have been cut is proposed in un-dredged riparian areas.
- Restoring wetland vegetation in dredged areas by planting appropriate emergent and shoreline species in selected areas in the Fens, and along the Fens, Riverway, Leverett Pond, and Willow Pond shoreline. Approximately 3.5 acres (152,460 square feet) of emergent vegetation will be planted.
- Restoring riparian vegetation in upland areas by planting trees and shrubs where *Phragmites* is eradicated.
- Restoring vegetation and other landscape features disturbed at staging areas.
- Installing boulders in the Fens, Riverway, and Leverett Pond to improve fisheries habitat. Approximately 100 boulders or boulder clusters will be installed.
- Installing 10 in-stream deflectors in the Riverway to create scour holes to diversify aquatic habitat.
- Installing 25 to 50 habitat logs to restore basking sites for turtles and amphibians in dredged areas.
- Restoring the Babbling Brook between Willow and Leverett Ponds.

- Removing sediment from Spring Pond and controlling erosion to the pond to restore and protect the three spine stickleback habitat.

Table 5-1 summarizes the volumes of sediment to be removed by river location and identifies its project purpose.

Table 5-1
Approximate Sediment Removal Volumes and Project Purpose

<i>Location</i>	<i>Flood Control (cy)</i>	<i>Environmental Restoration (cy)</i>	<i>Total Volume (cy)</i>
Back Bay Fens	53,000	66,000	119,000
Riverway	9,000	22,000	31,000
Leverett Pond	3,000	26,000	29,000
Willow Pond	0	5,000	5,000
Ward's Pond	0	16,000	16,000
Total	65,000	135,000	200,000

Source: USACE Decision Document and Environmental Assessment

A discussion of the project's impacts and benefits is presented in Section 2.5 of this SFEIR.

5.3 Summary of Compliance with the Wetlands Protection Act

5.3.1 Protecting the Interests of the Act

The proposed project involves flood control improvements, habitat restoration and historic restoration of the Muddy River Reservation through Brookline and Boston. The project has several objectives that serve to restore and protect the interests of the Wetlands Protection Act (the Act) (noted in parentheses below):

- 1) Alleviate flooding along the river corridor and reduce flood damage to public and private property (flood control and storm damage prevention);
- 2) Improve the water quality of the river by restoring river hydraulics to original conditions and removing contaminated sediments (prevention of pollution and protection of fisheries);
- 3) Restore shoreline plantings to increase plant species diversity and structural diversity to the riparian plant community compared to existing conditions (protection of wildlife habitat);
- 4) Implement a watershed BMP program to reduce the sediment load to the Muddy River (prevention of pollution).

The four basic project purposes listed above serve to restore and protect five of the eight interests of the Act. The project purpose of historic rehabilitation, while important to the legacy of the park, does not address interests of the Act.

The design of the project elements will maintain and improve the interests of the Act presently supported by the Muddy River wetlands. Similar to the interests protected by the state Act, the USACE defines 13 functions and values of wetlands. Table 5-2 below presents a comparison of the interests of the Act to federally defined wetland functions and values. The relevance of these functions and values to areas along the Muddy River is summarized in Table 5-3. Table 5-4 summarizes impacts for each river segment of the project area. The project elements will improve the capacity of resource areas along the Muddy River to protect the interests of the Act or result in a net increase of resource areas along the river. As presented in Table 5-4, the project will result in no net loss of wetland resources along the entire project corridor.

Table 5-2
Comparison of Wetland Protection Act Interests to
USACE Functions and Values

<i>Wetland Protection Act Interest</i>	<i>USACE Functions and Values</i>
Protection of public or private water supply	Groundwater Recharge/Discharge
Protection of groundwater supply	Sediment and Toxicant Retention, Groundwater Recharge/Discharge
Flood control	Flood Flow Alteration
Storm damage prevention	Flood Flow Alteration Sediment and Shoreline Stabilization
Prevention of Pollution	Sediment and Toxicant Retention, Nutrient Removal, Sediment Stabilization
Protection of land containing shellfish	Fish and Shellfish Habitat, Endangered Species Habitat
Protection of fisheries	Fish and Shellfish Habitat, Endangered Species Habitat
Protection of wildlife habitat	Wildlife Habitat, Endangered Species Habitat

The dredging component of the project will improve the interests of flood control and storm damage prevention throughout the project corridor, as well as the wildlife habitat and fisheries interests in the Back Bay Fens and Riverway segments. Removal of the contaminated river sediments throughout the river corridor will remove a source of pollution and prevent recontamination of downstream areas in the future, thus supporting the prevention of pollution interest. Restoration of the riparian plant community will improve the wildlife habitat of the banks compared to existing conditions. Removal of the *Phragmites* stands within the river in the Fens and Riverway will diminish somewhat the pollutant removal ability of the Back Bay Fens and the Riverway segments.

Table 5-3
Summary of Wetlands Functions and Values

Location	Status	Groundwater Recharge/Discharge	Flood Flow Alteration	Fish & Shellfish Habitat	Sediment & Toxicant Retention	Nutrient Removal	Production Export	Sediment/Shoreline Stabilization	Wildlife Habitat	Recreation	Educational/Scientific Value	Uniqueness/Heritage	Visual Quality/Aesthetics	Endangered Species Habitat
Back Bay Fens Victory Garden	Occurrence	N	Y	Y	Y	Y	N	Y	N	Y	N	N	N	N
	Principal Function/Value	Y		Y	Y									
Riverway Area	Occurrence	N	Y	Y	Y	Y	N	Y	N	Y	N	N	N	N
	Principal Function/Value	Y	Y	Y	Y									
Leverett Pond	Occurrence	N	N	Y	N		N	Y	N	Y	N	N	N	N
	Principal Function/Value		Y							Y				
Willow Pond	Occurrence	N	N	Y	N		N	Y	N	Y	N	N	Y	Y
	Principal Function/Value		Y	Y						Y				
Wards Pond	Occurrence	Y	N	Y	Y		Y	Y	Y	Y	N		Y	N
	Principal Function/Value								Y	Y				

Table 5-4
Summary of Wetland Impacts for Each River Segment

Wetland Resource Areas		Back Bay Fens	Riverway (Olmsted Park)	Leverett Pond (Olmsted Park)	Willow Pond (Olmsted Park)	Ward's Pond (Olmsted Park)	Total
Inland Bank (lf)	Existing	13,540 lf	12,670 lf	4,540 lf	800 lf	1,260 lf	32,810 lf
	Proposed	15,230 lf	12,670 lf	4,540 lf	929 lf	1,260 lf	34,629 lf
	Change	+1690* lf	0 lf	0 lf	129 lf	0 lf	+1,819 lf
Land Under Water (ac)	Existing	16.2 ac	9.4 ac	9.9 ac	0.6 ac	1.8 ac	37.9 ac
	Proposed	19.0 ac	9.4 ac	9.9 ac	0.5 ac	1.8 ac	39.6 ac
	Change	+2.8* ac (121,968 sf)	0 ac	0 ac	-0.1 ac (4,355 sf)	0 ac	+2.7 ac (117,610 sf)
BVW (ac)	Existing	0.4 ac	0.7 ac	0.2 ac	0.8 ac	0.6 ac	2.7 ac
	Proposed	0.7 ac	0.98 ac	0.3 ac	0.8 ac	0.6 ac	3.38 ac
	Change	+0.29 ac (12,415 sf)	+0.28** ac (12,150 sf)	+0.1 (4,340 sf)	0 ac	0 ac	+0.66 ac (28,905 sf)

* This increase includes daylighting the Muddy River at Avenue Louis Pasteur and the former Sear Parking Lot.

** Approximately 12,150 sf of the total vegetation area is above OHW and is considered to be BVW; and 9,710 sf is below OHW and is considered to be Bank/Land Under Water.

Note: BLSF is defined by the FEMA mapped 100-year flood plain and Riverfront Area is defined by a 200-foot line offset from the mean annual flood elevation (25 feet in Boston). The proposed dredging project will not change the extent of either wetland resource area and therefore they are not presented in this table.

5.3.2 Qualifying as a Limited Project

There are no thresholds or upper limits for alterations to Land Under Water or Inland Bank above which a Conservation Commission cannot issue an Order of Conditions. However, Conservation Commissions cannot issue an Order of Conditions for the alteration of more than 5,000 square feet of Bordering Vegetated Wetland (BVW) unless the activity is a limited project activity. As documented in the DEIR, the project will require alteration of more than 5,000 square feet of BVW. Therefore, this project must meet the limited project criteria for approval via an Order of Conditions; otherwise a variance issued by the DEP Commissioner will be required.

The work in the Back Bay Fens, the Riverway, and three ponds is proposed as a limited project pursuant to 310 CMR 10.53(4), which allows projects to proceed that *“will improve the natural capacity of a resource area(s) to protect the interests”* of the Act, provided the activity does not adversely affect the ability of the resource area to protect the other interests of the Act or results in no change (i.e., neutral effect) to the capacity of the resource area to protect the other interests of the Act. Limited project compliance is discussed by river segment in Section 5.4.

Subsequent to the issuance of the Certificate on the FEIR, the project proponents have met with DEP several times about project revisions as presented in this SFEIR. Through the development of the SFEIR, drafts of this wetlands section were reviewed by DEP and their comments were incorporated into the revised project presented herein. Based on DEP comments through this review process, it is the proponents' opinion that the project presented in the SFEIR can be approved as a limited project, and that a variance from the Wetlands Protection Act will not be required.

5.4 Description of the Proposed Project by River Segment

5.4.1 Introduction

The following sections describe the proposed activities within the various geographic subdivisions of the Muddy River – The Back Bay Fens, The Riverway, and the Ponds (also referred to as Olmsted Park). These sections describe the:

- Existing conditions of each river segment,
- Functions and values or “interests” supported by each river segment,
- Proposed work and impacts, and
- Proposed mitigation measures.

Table 5-4, presented previously, presents the inventory of wetland resource areas throughout the Muddy River corridor, for both existing and future conditions. The proposed project will not alter the extent of Riverfront Area or Bordering Land

Subject to Flooding and therefore those resource areas are not included in the inventory.

Table 5-5 below documents the extent of BVW alteration along with proposed BVW restoration and replication by river segment.

Table 5-5
Summary of BVW Impacts and Mitigation in the Muddy River by Segment

<i>River Segment</i>	<i>BVW Loss</i>	<i>BVW Replication</i>	<i>Net Change</i>	<i>BVW Restoration</i>
Back Bay Fens	0 s.f.	12,415 s.f.	+12,415 s.f.	13,100 s.f.
Riverway	9,135 s.f.	12,150 s.f.	+ 3,015 s.f.	6,180 s.f.
Ponds (Olmsted Park)	3,820 s.f.	4,340 s.f.	+520 s.f.	25,750 s.f.

Figures 5-2 through 5-11 present the proposed plans for the entire Muddy River Project.

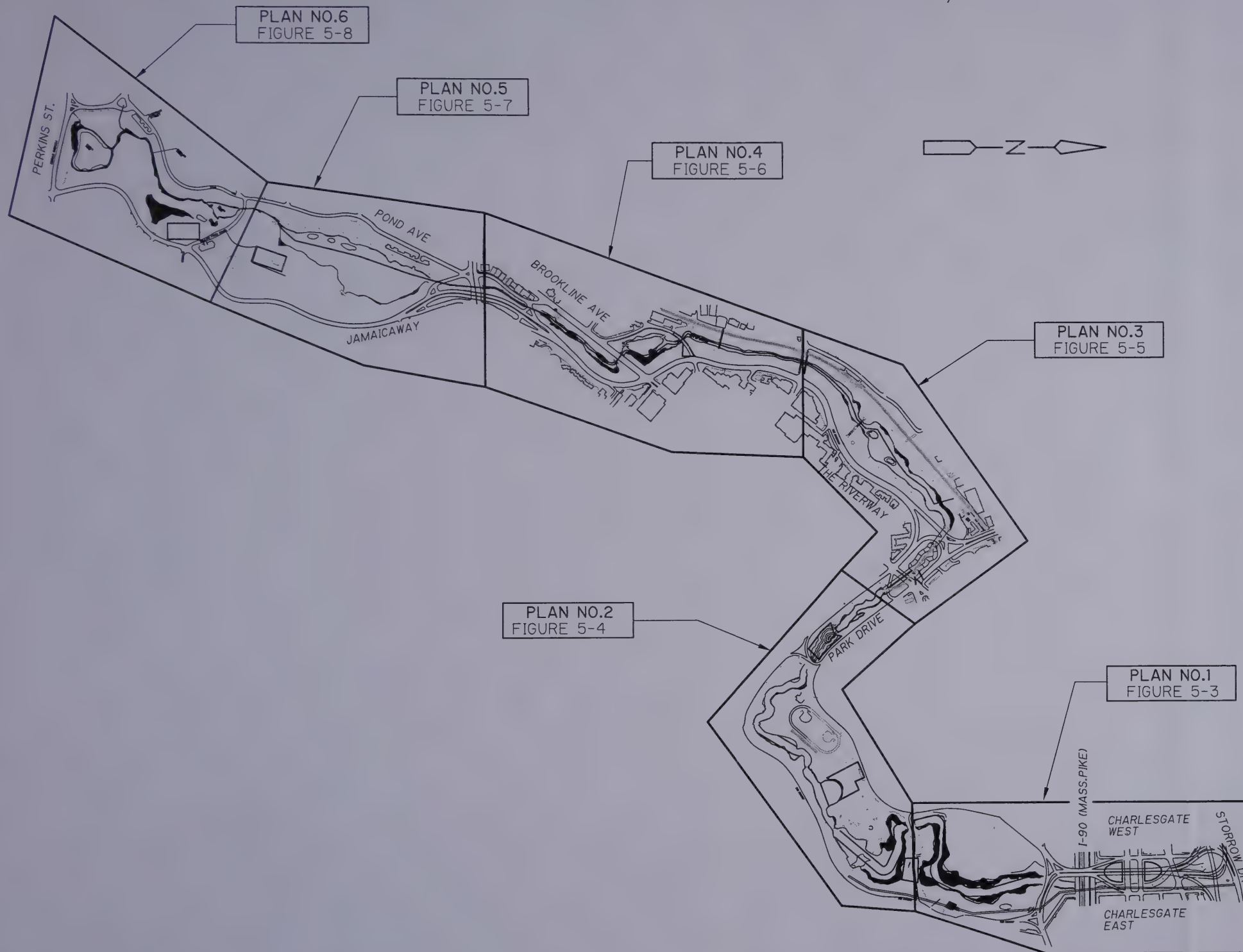
5.4.2 The Back Bay Fens

Wetland resources in the Back Bay Fens include Land Under Water, Inland Bank, Bordering Vegetated Wetlands (BVW), Bordering Land Subject to Flooding and Riverfront Area, as well as the 100-foot buffer zone to Inland Bank and BVW. Both the Boston and Brookline Conservation Commissions established the boundaries of these resource areas in Boston and Brookline, throughout the project corridor, via the issuance of Orders of Resource Area Determination. The following section describes the existing conditions and interests supported by the resource areas in the Back Bay Fens, followed by a discussion of impacts and proposed mitigation.

5.4.2.1 Existing Conditions and Interests of the Act

As described in the USACE Environmental Assessment (USACE EA), the Back Bay Fens is a series of shallow ponds located between the Riverway and the Charlesgate section of the Muddy River. The Fens is all that remains of the 750-acre Back Bay of the Charles River, which was filled in the mid-nineteenth century. The total existing water surface of the Fens today is about 16 acres (including emergent wetland).

The Back Bay Fens also contains two sections of river where the original channel has been culverted and filled over, including a 900-linear foot section of the river conveyed in twin 6-foot diameter culverts from the Boston Parks Department Back Bay Yard to below Brookline Avenue, and a second culverted section of approximately 415 feet located upstream of the Avenue Louis Pasteur. The river is conveyed in an open channel for the remainder of its length through the Back Bay Fens with short culverts or bridge crossings of varying lengths conveying the river under roadways or pedestrian bridges.



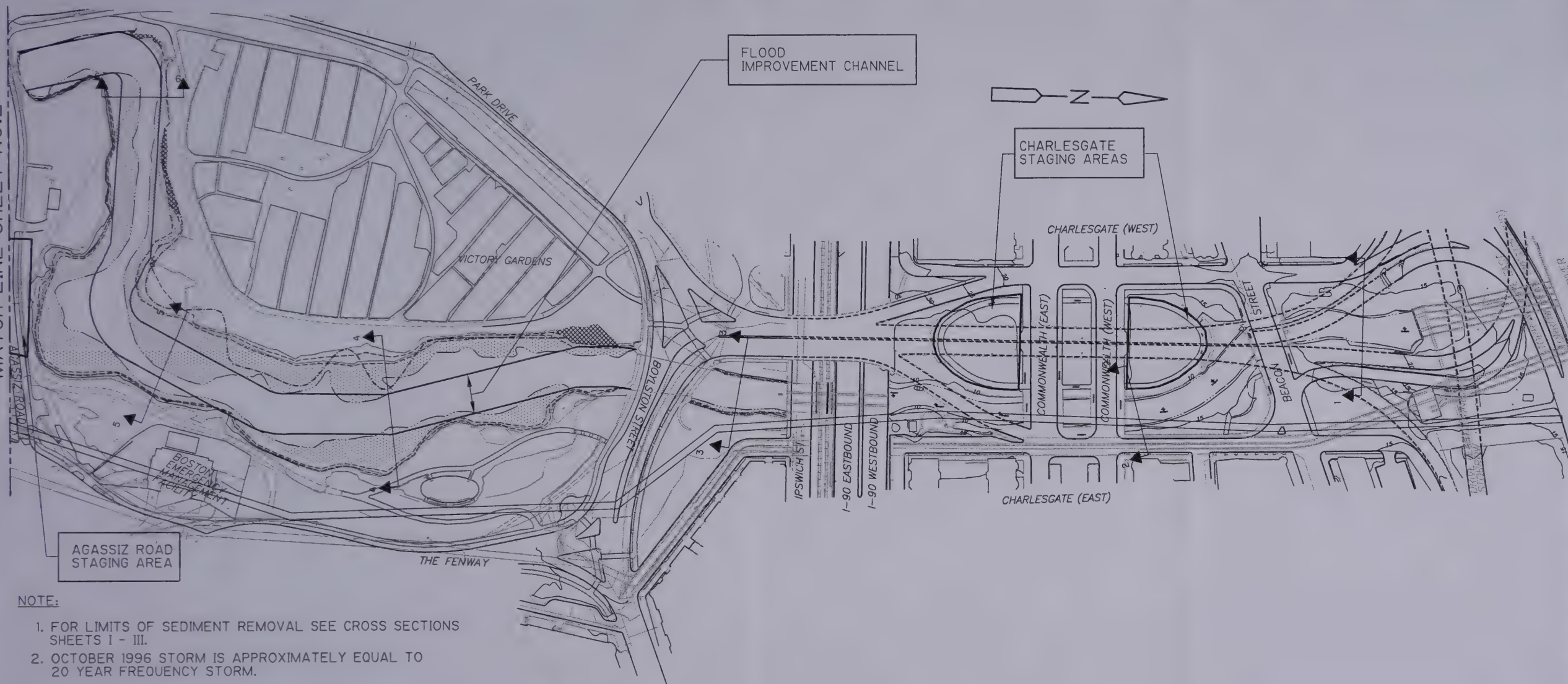
1" = 1000'
 500 0 1000

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WATER RESOURCES DEVELOPMENT PROJECT
 MUDDY RIVER, BOSTON, MASSACHUSETTS
 RECOMMENDED PLAN-FLOOD CONTROL &
 ENVIRONMENTAL RESTORATION - KEYPLAN

FIG.
 5-2

MATCH LINE SHEET NO.2

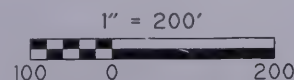


NOTE:

1. FOR LIMITS OF SEDIMENT REMOVAL SEE CROSS SECTIONS SHEETS I - III.
2. OCTOBER 1996 STORM IS APPROXIMATELY EQUAL TO 20 YEAR FREQUENCY STORM.
3. ELEVATIONS AT BOSTON CITY BASE (BCB) NGVD-29 IS BCB+5.65.

LEGEND

- PHRAGMITES LIMITS
- STAGING AREAS
- BORDERING VEGETATED WETLAND
- FLOOD IMPROVEMENT CHANNEL LIMITS.
- TOP AND BOTTOM OF BANK AREA
- 1920 RESTORED SHORELINE
- CROSS SECTION



BACK BAY FENS

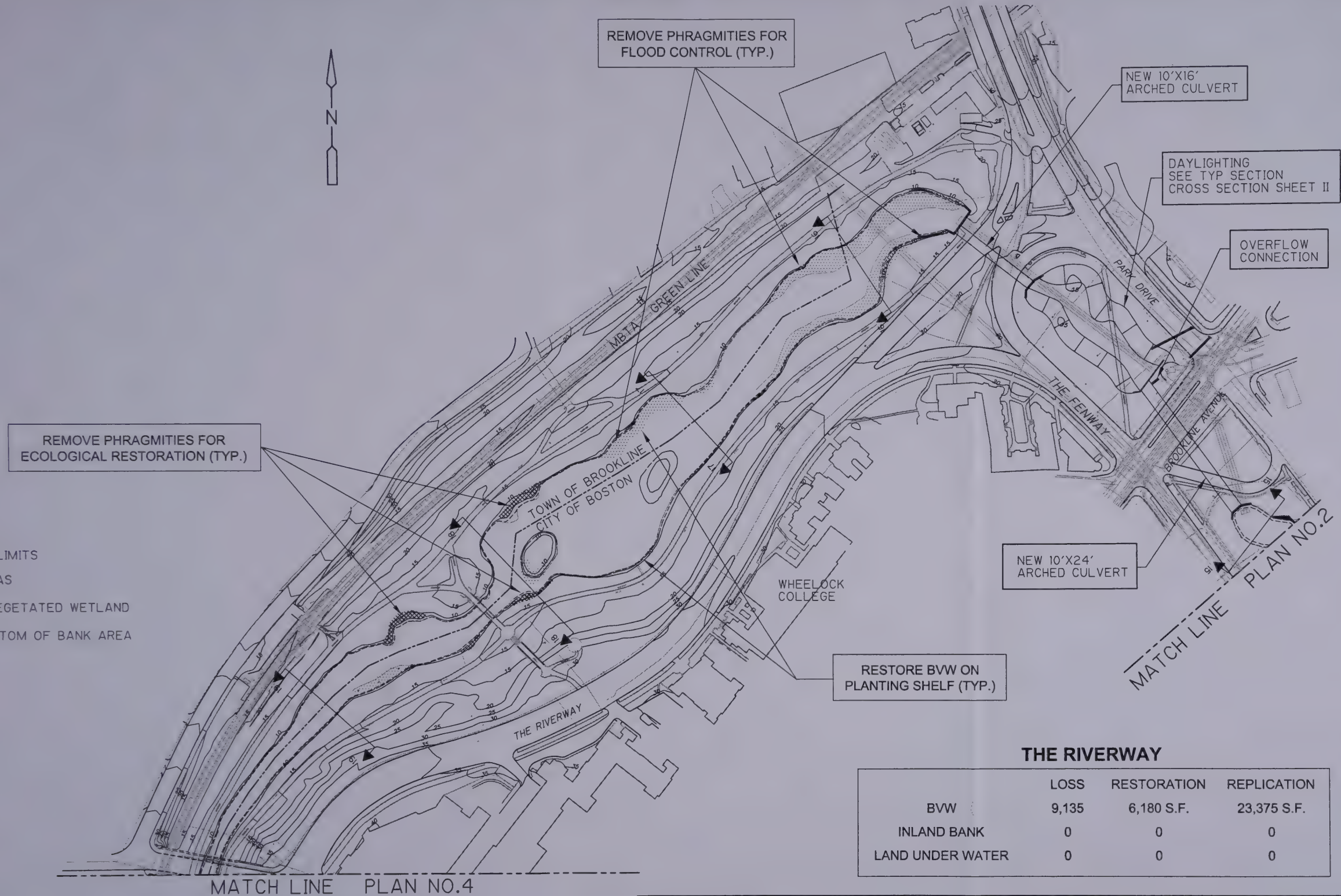
	LOSS	RESTORATION	REPLICATION
BVW	0	13,100	12,415
INLAND BANK	0	0	1,690 L.F.
LAND UNDER WATER	0	1.8 AC	1 AC

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WATER RESOURCES DEVELOPMENT PROJECT
MUDDY RIVER, BOSTON, MASSACHUSETTS
FLOOD IMPROVEMENTS FOR THE
25 YEAR STORM - PLAN NO.1

FIG.
5-3



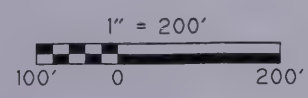


LEGEND

- PHRAGMITES LIMITS
- STAGING AREAS
- BORDERING VEGETATED WETLAND
- TOP AND BOTTOM OF BANK AREA

THE RIVERWAY

	LOSS	RESTORATION	REPLICATION
BVW	9,135	6,180 S.F.	23,375 S.F.
INLAND BANK	0	0	0
LAND UNDER WATER	0	0	0



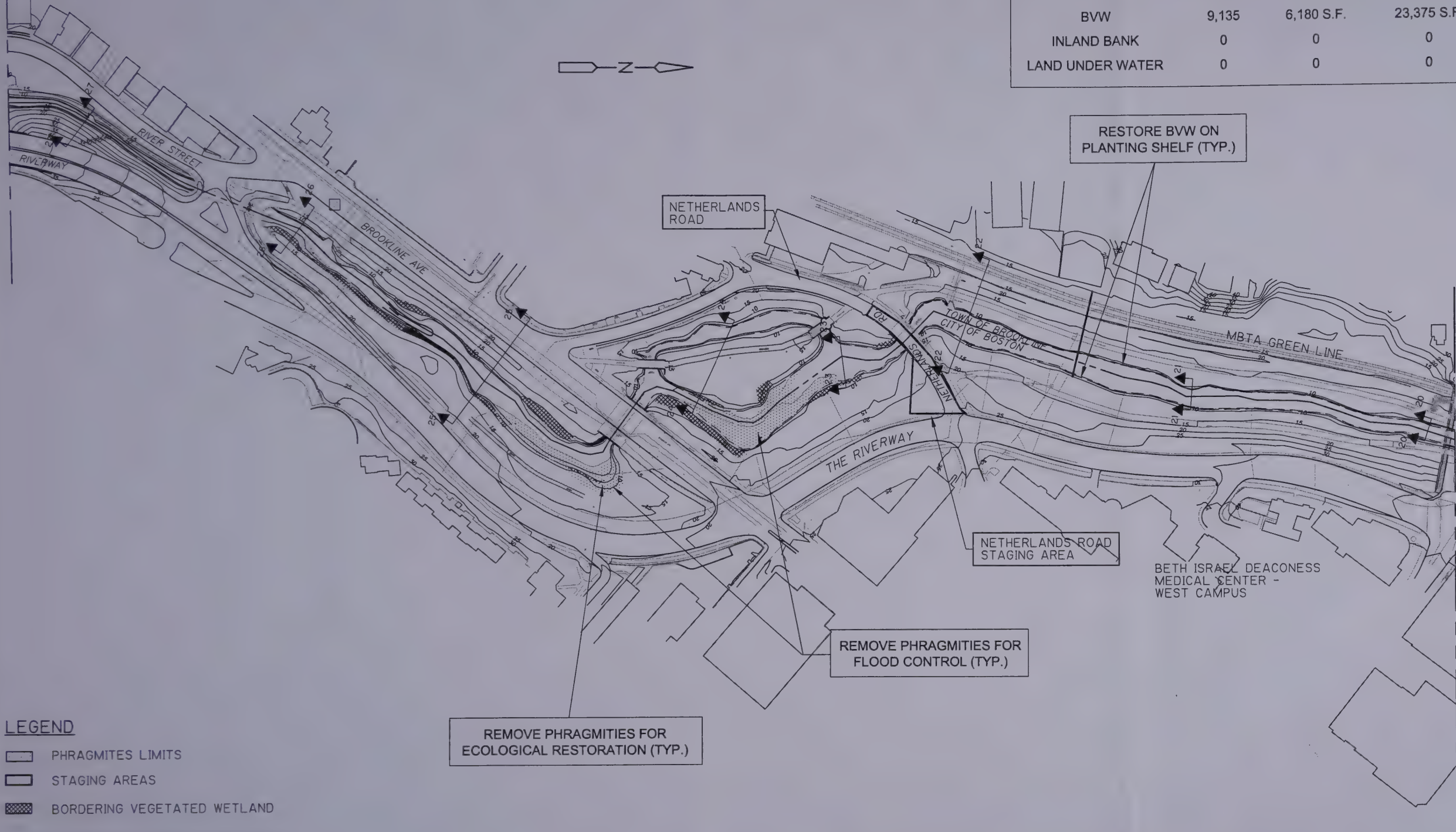
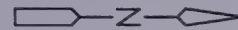
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MUDDY RIVER, BOSTON, MASSACHUSETTS
RECOMMENDED PLAN-FLOOD CONTROL &
ENVIRONMENTAL RESTORATION - PLAN NO.3

MATCH LINE PLAN NO.5

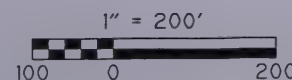
THE RIVERWAY

	LOSS	RESTORATION	REPLICATION
BVW	9,135	6,180 S.F.	23,375 S.F.
INLAND BANK	0	0	0
LAND UNDER WATER	0	0	0



LEGEND

- PHRAGMITES LIMITS
- STAGING AREAS
- BORDERING VEGETATED WETLAND
- TOP AND BOTTOM OF BANK AREA



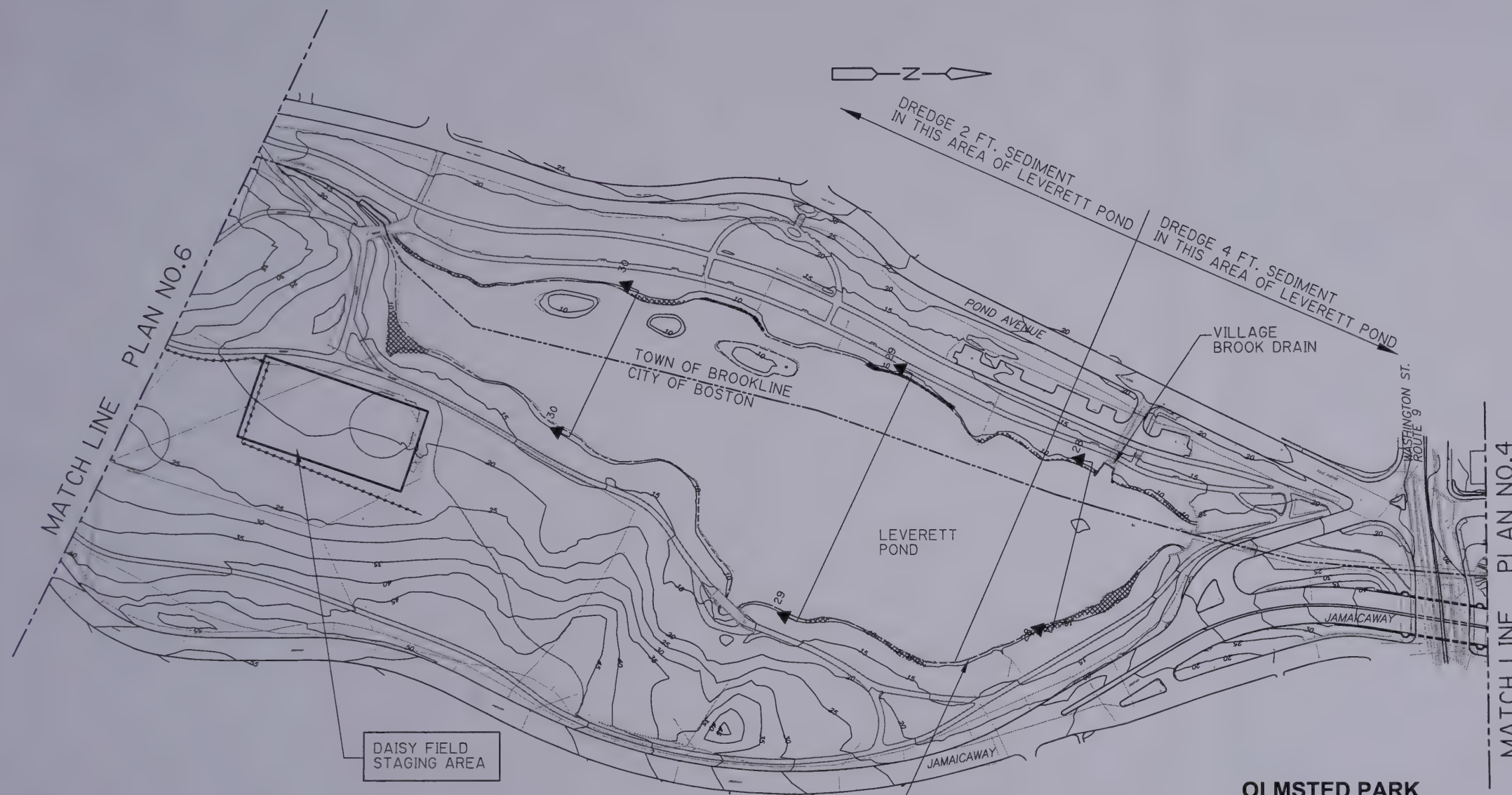
DEPARTMENT OF THE ARMY

NEW ENGLAND DISTRICT
CORPS OF ENGINEERS

CONCORD, MASSACHUSETTS

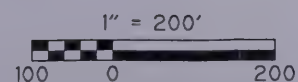
WATER RESOURCES DEVELOPMENT PROJECT
MUDDY RIVER, BOSTON, MASSACHUSETTS
RECOMMENDED PLAN-FLOOD CONTROL &
ENVIRONMENTAL RESTORATION - PLAN NO.4

FIG.
5-6



LEGEND

- PHRAGMITES LIMITS
- STAGING AREAS
- BORDERING VEGETATED WETLAND
- TOP AND BOTTOM OF BANK AREA



OLMSTED PARK

	LOSS	RESTORATION	REPLICATION
BVW	3,820 S.F.	25,760 S.F.	4,340 S.F.
INLAND BANK	0	0	0
LAND UNDER WATER	0.1 AC	0	0

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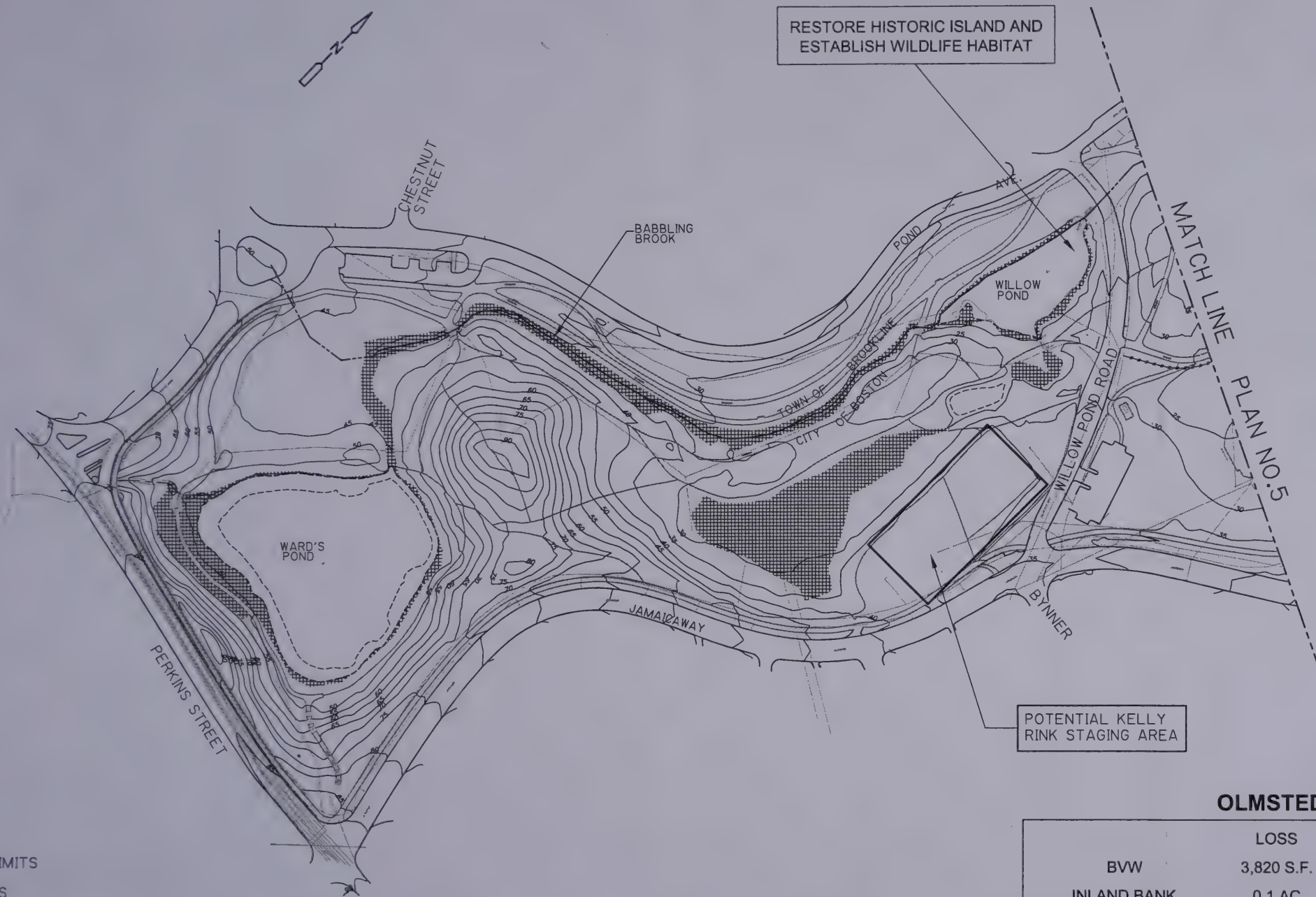
CONCORD, MASSACHUSETTS

WATER RESOURCES DEVELOPMENT PROJECT

MUDDY RIVER, BOSTON, MASSACHUSETTS

RECOMMENDED PLAN-FLOOD CONTROL &
ENVIRONMENTAL RESTORATION - PLAN NO.5

FIG.
5-7



LEGEND

- PHRAGMITES LIMITS
- STAGING AREAS
- BORDERING VEGETATED WETLAND
- TOP AND BOTTOM OF BANK AREA

1" = 200'

100 0 200

OLMSTED PARK

	LOSS	RESTORATION	REPLICATION
BWW	3,820 S.F.	25,760	4,340
INLAND BANK	0.1 AC	0	0
LAND UNDER WATER	0	0	0

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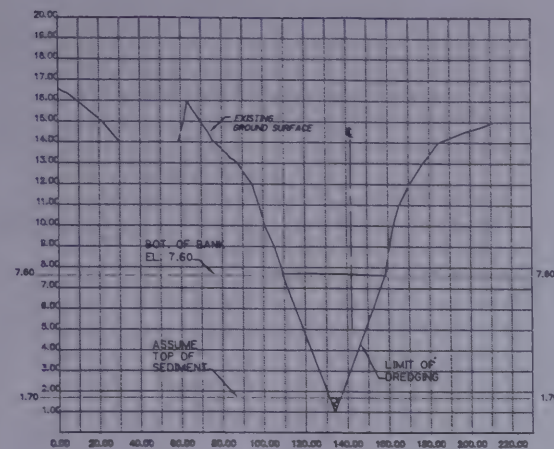
CONCORD, MASSACHUSETTS

WATER RESOURCES DEVELOPMENT PROJECT

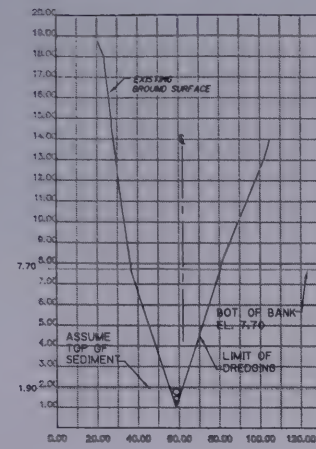
MUDDY RIVER, BOSTON, MASSACHUSETTS

RECOMMENDED PLAN-FLOOD CONTROL &
ENVIRONMENTAL RESTORATION - PLAN NO.6

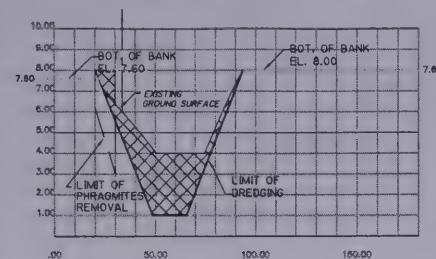
FIG.
5-8



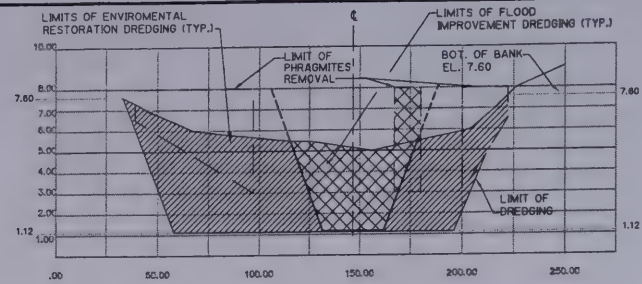
SECTION 1



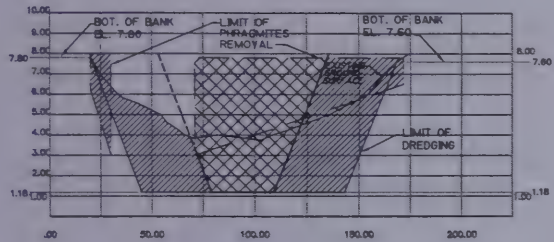
SECTION 2



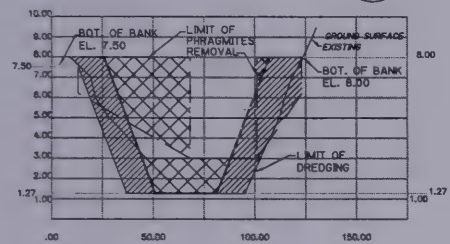
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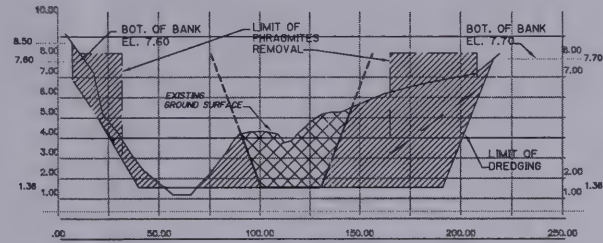
SECTION 4



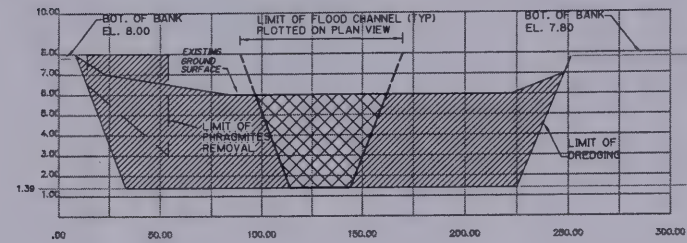
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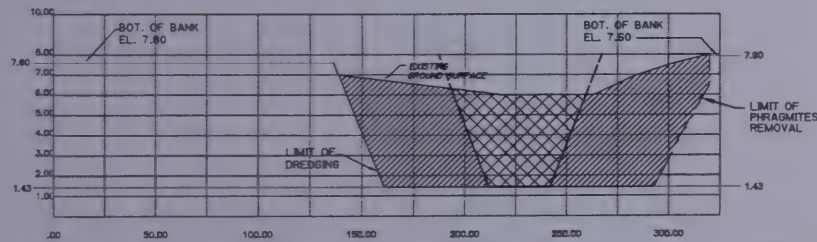
SECTION 6



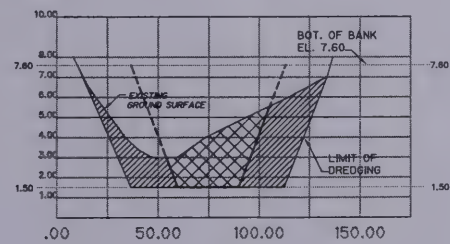
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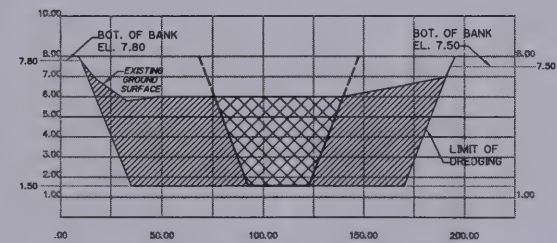
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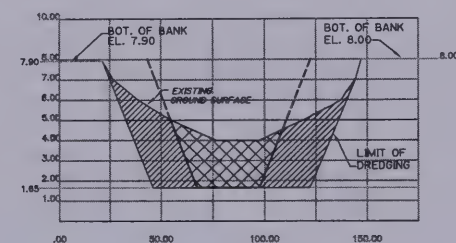
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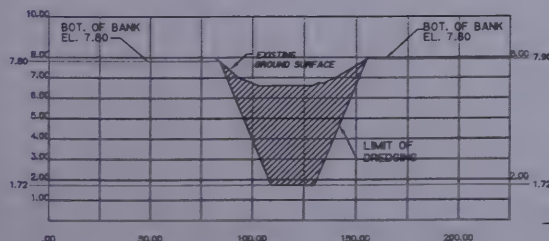
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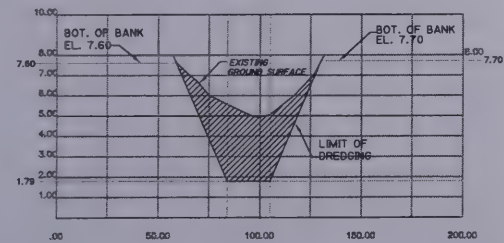
SECTION 10



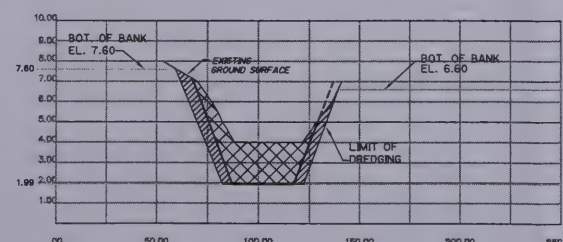
SECTION 11



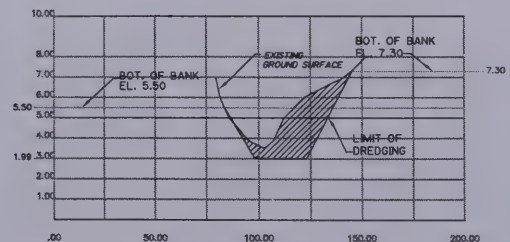
SECTION 12



SECTION 13



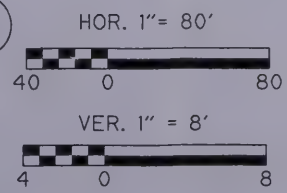
SECTION 14



SECTION 15

NOTES:

- LIMIT OF DREDGING LABELED IS LIMIT OF ENVIRONMENTAL RESTORATION DREDGING
- CROSS HATCHED DREDGING LIMIT IS OF FLOOD IMPROVEMENTS CHANNEL ONLY.

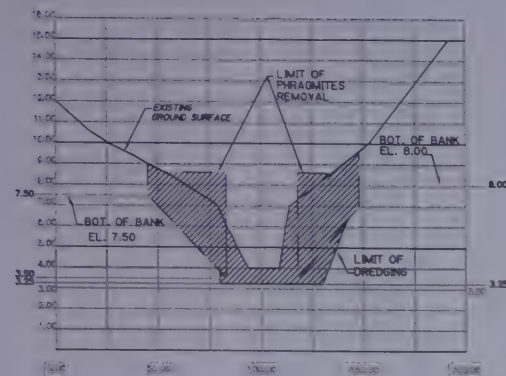


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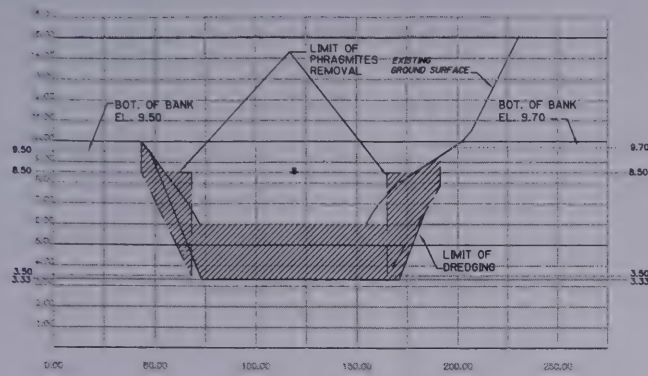
VERTICAL DATUM: BOSTON CITY BASE (BCB)

WATER RESOURCES DEVELOPMENT PROJECT
MUDDY RIVER, BOSTON, MASSACHUSETTS
RECOMMENDED PLAN-FLOOD CONTROL &
ENVIRONMENTAL RESTORATION
CHANNEL SECTIONS 1

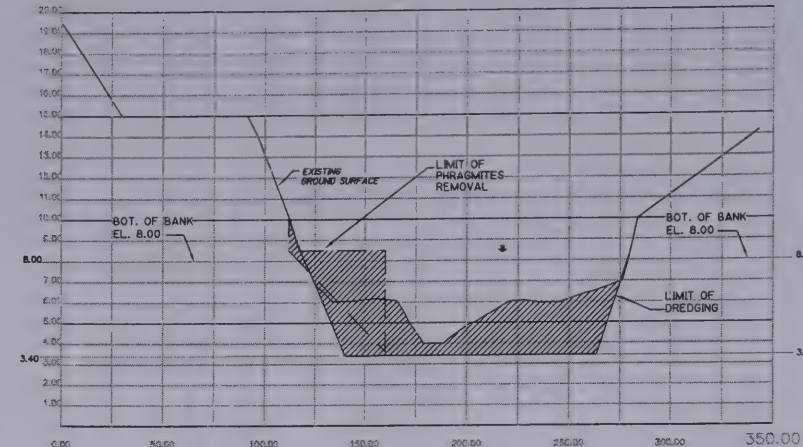
FIG. 5-9



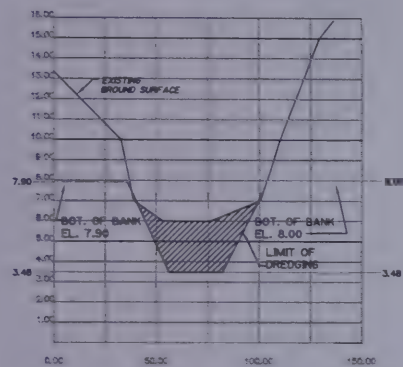
SECTION 16



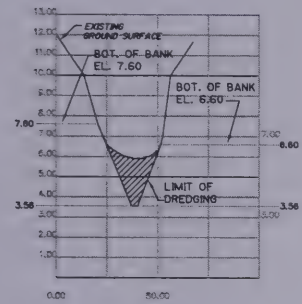
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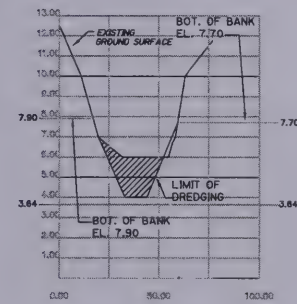
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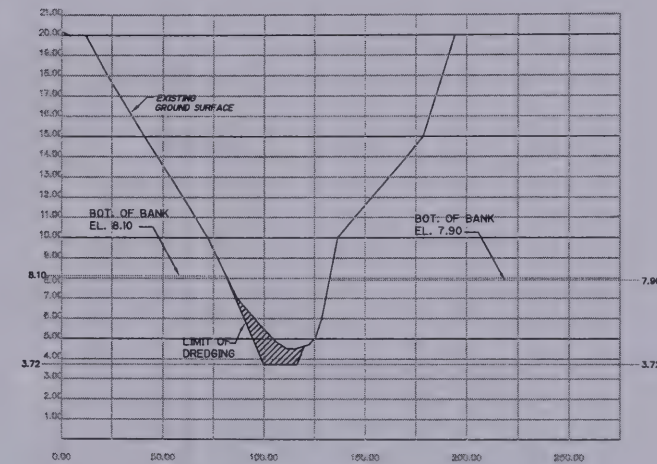
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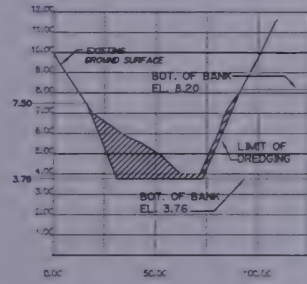
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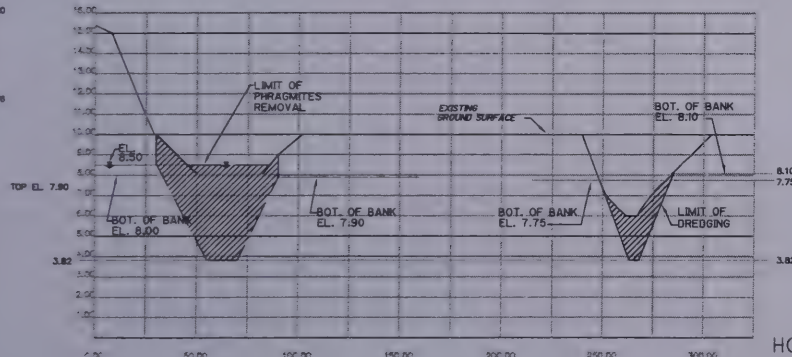
SECTION 21



SECTION 22



SECTION 23

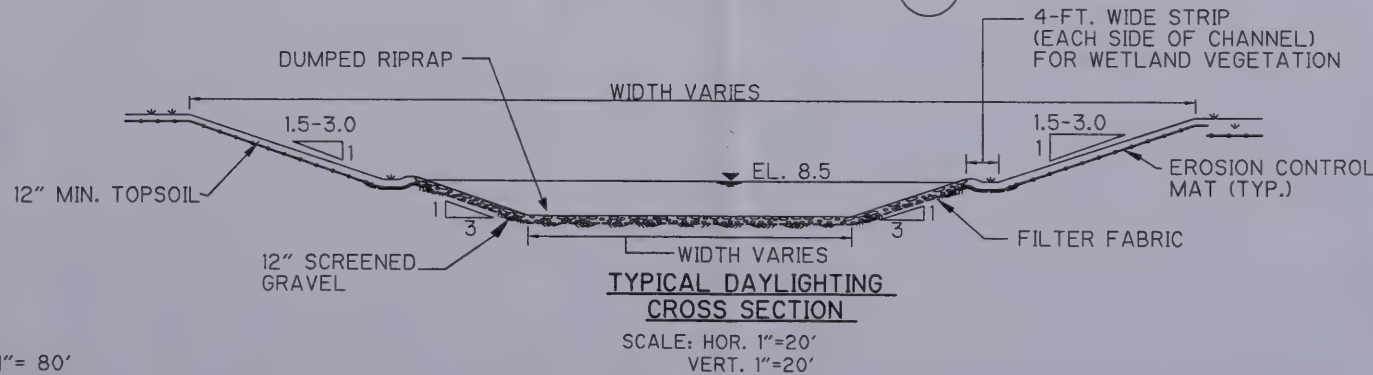


SECTION 24

HOR. 1" = 80'

VER. 1" = 8'

VERTICAL DATUM: BOSTON CITY BASE (BCB)

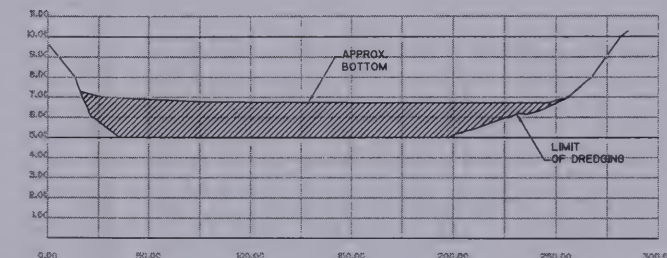
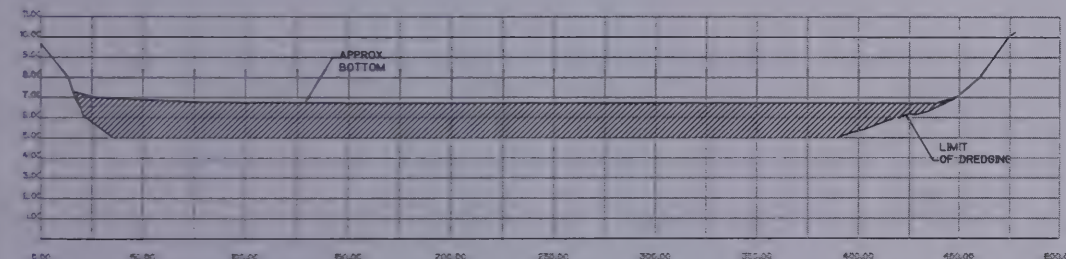
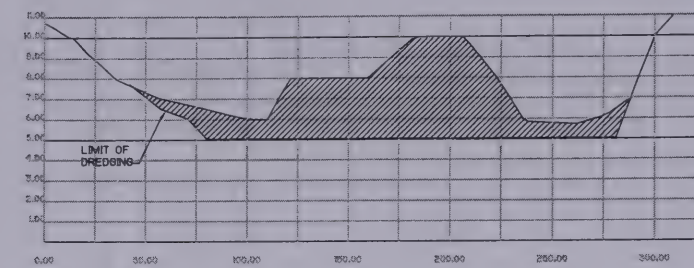
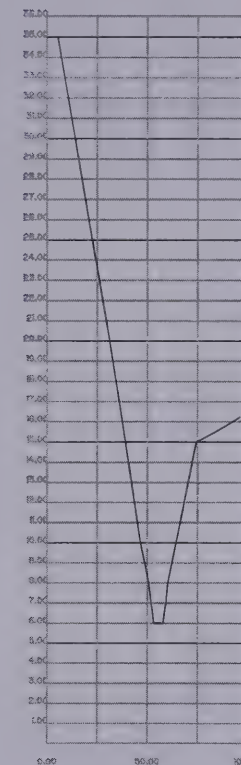
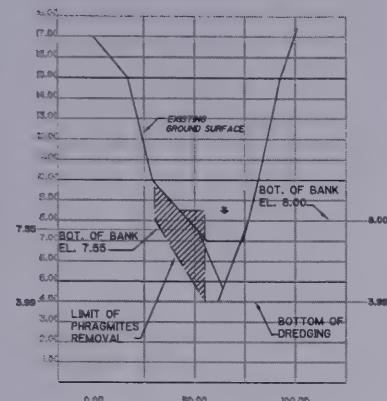
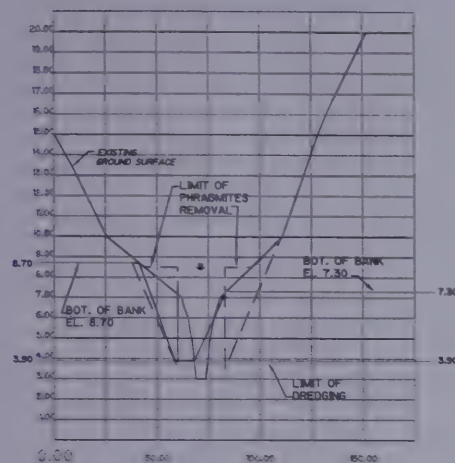


NOTE:
ALL DREDGING LIMITS SHOWN ON THIS SHEET ARE
LIMITS OF ENVIRONMENTAL RESTORATION DREDGING.

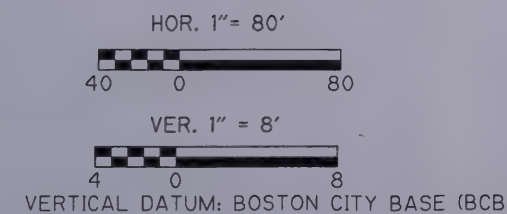
DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT
CORPS OF ENGINEERS
CONCORD, MASSACHUSETTS

WATER RESOURCES DEVELOPMENT PROJECT
MUDDY RIVER, BOSTON, MASSACHUSETTS
RECOMMENDED PLAN-FLOOD CONTROL &
ENVIRONMENTAL RESTORATION
CHANNEL SECTIONS II

FIG. 5-10



NOTE:
ALL DREDGING LIMITS SHOWN ON THIS SHEET ARE
LIMITS OF ENVIRONMENTAL RESTORATION DREDGING.



The Muddy River supports flood flow alteration function (flood control) due to its low flow rate, number of flow constrictions at culverts and dense *Phragmites* stands and meanders.

The river is fairly shallow throughout much of this river segment, varying from two to four feet deep. The sediments in the river have been documented to be toxic to aquatic life. Appendix D to the Muddy River, Boston and Brookline, Massachusetts Decision Document and Environmental Assessment, presents the Sediment Quality and Ecological Risk Evaluation (USACE, 2003), which concludes that the river sediments are considered toxic to aquatic organisms.

Contaminant concentrations were observed to be higher in surface sediment and to decline with depth (USACE, 2003) based on analysis of sediment cores collected at varying depths below the surface. Sediment is likely to adversely affect benthic organisms and fish at all stations along the river corridor (from the ponds to the confluence with the Charles River) except Ward's Pond, based on comparison of river sediment data to sediment quality guidelines and bioassay test results. Food chain modeling identified a risk to avian populations at all stations. The Riverway and Back Bay Fens sediment have the highest concentrations of PCBs and the greatest bioaccumulation of PCBs in fish. Consequently, risk to piscivorous wildlife is highest to animals that feed in these two river segments. Risks are also present for insectivorous birds, feeding on insects that emerge from aquatic larval life stages.

The contaminated sediments adversely affect the aquatic macro invertebrate and pelagic communities in terms of species diversity. Both communities exhibit low species diversity as they are dominated by pollution tolerant species. As stated above, there is potential for bioaccumulation of contaminants for species higher on the food chain that inhabit and/or feed in the Back Bay Fens. This condition limits the fisheries habitat (fisheries interest) and wildlife habitat interest of the Muddy River in the Back Bay Fens.

The character of the bordering vegetation varies throughout this river segment. In the upper reaches, between Avenue Louis Pasteur and the Back Bay Yard, the river banks are fairly steep and support a narrow fringe of vegetation. These areas support significant tree cover with an understory of shrubs and herbaceous vegetation. Beyond the tree/shrub river margins, the park supports lawn areas. In the vicinity of Clemente Field, the reflecting pool and the Rose Garden, the river flows through open lawn areas planted with groupings of landscaped trees. A very narrow fringe of herbaceous plants is present along the river banks through this segment of the river. At the end of the Back Bay Fens segment of the river, starting at a point in the vicinity of the Stony Brook Gate House/War Memorial, just upstream of Agassiz Way, significant stands of common reed (*Phragmites australis*) dominate the river bank and the adjacent shoreline to Park Avenue.

Phragmites (common reed) is also present throughout the lower Back Bay Fens, dominating the shoreline and growing into the river channel. It occupies about 5.4

acres in the Back Bay Fens. (See Section 5.5 of this SFEIR for a more detailed description of the natural history, and federally defined wetland functions and values supported by *Phragmites*.) In summary, *Phragmites* supports the physical functions of shoreline/sediment stabilization and sediment/toxicant/nutrient retention quite well. However, the wildlife habitat value of wetlands dominated by common reed depends upon a number of factors. It is generally found to provide less nutritional value and often support a less diverse bird population than marshes dominated by native species. However, based on the information presented in the literature, one needs to evaluate its effectiveness on a case-by-case basis. This is especially true in an urban environment where a *Phragmites* marsh may provide the only marsh habitat available to area wildlife. See Section 5.5 of this SFEIR for a discussion of *Phragmites* functions and values in the Muddy River.

As documented in the Draft and FEIRs, the Back Bay Fens is identified as providing the federally defined functions of flood flow alteration, fish and shellfish habitat, sediment and toxicant retention, nutrient removal, sediment/shoreline stabilization and recreation functions. The principal functions /values are limited to flood flow alteration, sediment and toxicant retention and nutrient removal. All functions, except recreation, in the lower Back Bay Fens are primarily supported by the *Phragmites* stands present within the river. The wildlife habitat function in the lower Back Bay Fens is also supported by *Phragmites*, but to a lesser degree than would be expected from a diverse native plant community. Because the stands of *Phragmites* are essentially the only habitat available in the lower Fens, wildlife that is present in the area has adapted to use this community type.

5.4.2.2 Description of Work in Resource Areas and Proposed Mitigation

The purpose of the work in the Back Bay Fens is primarily to improve the flood control function and provide environmental restoration of the Muddy River. Approximately 53,000 cubic yards of dredging is proposed for flood control and approximately 66,000 cubic yards of dredging is proposed for environmental restoration. In addition to dredging, sections of the river now conveyed in culverts in the upper Fens will be returned to open channel flow, and degraded banks will be stabilized and restored. Work proposed in the Back Bay Fens involves the following activities:

1. Replacing approximately 700 linear feet of twin 6-foot-diameter culverts with a 200-foot long 10-foot by 16-foot arched culvert under the Riverway, restoring approximately 320 linear feet of the river to open channel flow (i.e., daylighting) in the location of the former Sears Parking Lot and installing a 10-foot by 24-foot arched culvert under Brookline Avenue.
2. Removing approximately 370 linear feet of a twin 6-foot-diameter culvert upstream of Avenue Louis Pasteur and replacing it with an open channel (i.e., daylighting).

3. Dredging a flood control channel throughout the Back Bay Fens segment of the river to improve the channel capacity and reduce flooding.
4. Removing *Phragmites* in the lower Back Bay Fens section of the river to remove the flow restriction caused by the *Phragmites* stands and reduce flooding.
5. Restoring the shoreline plantings to: 1) remove non-native species, 2) stabilize the bank where it exhibits signs of erosion, 3) improve structural and species diversity along this riparian corridor, and 4) maintain the original Olmsted design of this public waterfront park.

Work in the Back Bay Fens involves work within Land Under Water, Inland Bank, BVW, Bordering Land Subject to Flooding and Riverfront Area, as well as the 100-foot buffer zone to Inland Bank and/or BVW. The extent of work within wetland resource areas is presented in Table 5-5, above and shown on Figures 5-3 and 5-4. As documented in the Draft and FEIRs, these activities will occur within approximately 16.2 acres (705,670 square feet) of Land Under Water, 0.4 acres (17,425 square feet) of BVW and along 13,540 linear feet of Inland Bank, further described below. The following paragraphs describe the work in identified resource areas and applicable mitigations measures for each resource.

Land Under Water

Work in Land Under Water will involve dredging sediments to achieve proposed water depths of 4 to 6 feet deep. Dredging is proposed via hydraulic dredging, which removes sediment by suction. The sediment slurry will be transported to a dewatering area. Effluent from the dewatering operation will be returned to the river after any necessary treatment and dried sediment disposed off in accordance with local, state and federal requirements. *Phragmites* will be removed by hydraulic dredging in the areas where it has colonized the river channel (e.g., near Agassi Way and in the Victory Garden area). These areas of the river will be returned to open water habitat resulting in approximately 1.8 acres (78,410 square feet) of Land Under Water to be restored to exposed substrate and thus increasing open water habitat in the lower Fens. Dredging operations will not result in the loss of Land Under Water.

Inland Bank

Work on Inland Bank is limited to restoration of the Olmsted Plan throughout the river corridor and *Phragmites* eradication. Removal of non-native plants along the bank (e.g. buckthorn [*Rhamus* sp.], *Phragmites*, knotweed [*Polygonum cuspidatum*] etc.) and replanting native species will eradicate non-native species from the riparian corridor and improve plant species diversity of the bank. Where banks are experiencing erosion in the Back Bay Fens, the bank will be stabilized using bioengineered bank stabilization methods.

One common method of bank stabilization involves the use of coconut fiber rolls. Coconut fiber rolls will be installed along the toe of the eroded bank to provide immediate stabilization. Soil fill will be placed between the slope and the coconut roll

to fill the void between the roll and the bank. The roll, placed top soil, and the river bank will be planted with desired plants or seeded to establish a dense plant community along the shoreline. The roots of the plants will develop to stabilize the newly created bank. Final bank stabilization techniques, however, will be evaluated and developed during final design by the USACE. The proposed work will not result in the loss of Inland Bank in the Back Bay Fens.

Restoring open channel flow (i.e., daylighting) in the two locations identified on Figures 5-4 and 5-5 will result in the addition of 1,690 linear feet of Inland Bank. The bank along the daylighted areas will be planted in accordance with the Olmsted Plan to create a diverse plant community on the banks.

Bordering Vegetated Wetlands (BVW)

Pockets of BVW are present along the Muddy River throughout the Back Bay Fens. Alteration of BVW will occur in accessing the bank for restoration activities, and the river for dredging (most notably in the lower Fens) and from BVW restoration. The pockets of BVW in the lower Fens are dominated by *Phragmites*. *Phragmites* will be eradicated in these areas and the areas will be planted with species selected from the Olmsted planting list that are wetland indicator species (i.e., facultative, facultative wetland or obligate). The restored BVW will have a greater species diversity and structural diversity than the *Phragmites* stands.

Wetland replication areas are proposed in the lower Fens, in conjunction with the daylighted areas in the upper Fens. At this early planning stage, it is planned to establish replacement wetlands on a four-foot-wide shelf along the daylighted sections in the upper Fens, as shown on Figure 5-10. As final grading and planting plans are developed, the proponent will seek to maximize the extent of replacement BVW by widening this shelf where possible.

The daylighting of nearly 700 linear feet of the river in the upper reaches of the Back Bay Fens will serve to compensate for the alteration of resource areas elsewhere in the Back Bay Fens and yield a net increase in the area of Land Under Water, Inland Bank and BVW. The daylighting of the river in the two specified areas will result in approximately 1 acre (43,560 square feet) of additional Land Under Water, 1,690 linear feet of Inland Bank, and approximately 6,760 square feet of BVW. Please refer to Figures 5-4, 5-5 and 5-10 for a preliminary plan of wetland replication in these daylighted areas. These figures show proposed grading for the Inland Bank and BVW. Planted wetland indicator species along the shoreline will create an emergent zone in permanent and periodic flooded areas along the toe of the slope, and add wetland shrubs/trees on the slope and along the top of the slope. Upland species will be planted above the top of the slope. Species will be selected from native species utilized by Olmsted in his original design, as indicated in Table 5-7.

Additional replication areas are identified on Figures 5-3 and 5-4. Combined with the replication proposed in the daylighted areas, the project will result in the increase of 0.3 acres (12,415 square feet) of the BVW in the Back Bay Fens. This estimate is based

on a 4-foot-wide planting shelf. Additional BVW will be created if the shelf width is increased (to be evaluated during final design).

Bordering Land Subject to Flooding (BLSF), Riverfront Area, and 100-foot Buffer Zone

Impacts to BLSF, Riverfront Area, and the 100-foot buffer zone are associated with the execution of the dredging and dewatering activities, as well as for access to the river for these activities. Alteration of these resource areas adjacent to the river will be temporary in nature and all areas will be restored to preexisting elevations once work is completed.

Erosion and Sedimentation Control

Soil erosion and sediment control measures will be employed during Inland Bank and BVW restoration activities to prevent the transport of sediment to the river during earth working and planting activities. Erosion control practices including mulching, use of erosion control blankets, and temporary seeding will be used as necessary to control erosion. Sediment control barriers including silt fence and/or hay bales will be used to prevent the transport of sediment to the river during work in wetlands and along the shoreline. Silt curtains will be used to contain turbidity in the river. Sedimentation barriers will remain in place until exposed soils are permanently stabilized. A project-specific Sedimentation and Erosion Control Plan and Sedimentation and Erosion Control Construction Specifications will be prepared as part of the final design and be forwarded to the environmental permit issuing agencies, as applicable.

5.4.2.3 Limited Project Compliance

The proposed work is considered permissible as a limited project per regulation 310 CMR 10.53(4) which states:

“Notwithstanding the provisions of 310 CMR 10.54 through 10.57, the issuing authority may issue an Order of Conditions for projects which will improve the natural capacity of a resource area(s) to protect the interests identified in M.G.L. c. 131, § 40 (although no such project may be permitted which will have any adverse effect on specified wildlife habitat sites of rare vertebrate or invertebrate species as identified by procedures established under 310 CMR 10.59). Such projects include, but are not limited to, the removal of aquatic nuisance vegetation to retard pond and lake eutrophication and the thinning or planting of vegetation to improve habitat value.”

The project will improve the capacity of the resource areas to protect five of the eight interests of the Act in the Back Bay Fens. The channel dredging activities will improve the capacity of the Muddy River to provide flood control and prevent storm damage, while the removal of contaminated sediments and environmental restoration (which includes bank restoration, *Phragmites* removal, river daylighting, and re-planting of the corridor with native species) will protect/improve the interests of pollution prevention, fisheries, and wildlife habitat.

The proposed work in the Back Bay Fens (described in Section 5.4.1.2) will serve to improve the capacity of the wetland resource areas that comprise the Muddy River (Land Under Water, Inland Bank, BVW, BLSF and Riverfront Area) to protect the following interests of the Act: Flood Control; Storm Damage Prevention; Prevention of Pollution; Protection of Fisheries; and Protection of Wildlife Habitat.

Below is a review of the applicable interests of the Act and a discussion of how this project improves the capacity of the Back Bay Fens portion of the river to protect or support these interests.

Flood Control and Storm Damage Prevention

The initial impetus of this project was flood relief – improving the ability of the Muddy River to support the Flood Control and Storm Damage Prevention interests. The Draft and FEIRs and this SFEIR articulate the flooding problem and describe the measures needed to improve the flood flow capacity of the river resulting in reduced flooding and prevention of storm damage.

Flood control and storm damage prevention interests will be improved by dredging the flood improvement channel, daylighting approximately 700 linear feet of the river currently conveyed in culverts and removing dense stands of *Phragmites* in the lower Back Bay Fens section of the river (see Figures 5-1, 5-3 and 5-4). Hydraulic analyses conducted for this project reported that the river channel and existing culverts in the upper reaches of the Back Bay Fens area do not have the hydraulic capacity to convey flood flows and also that the stands of common reed reduce flood flow capacity and exacerbate flooding in the Back Bay Fens. Therefore, dredging a flood relief channel, daylighting portions of the culverted river and removing the *Phragmites* stands will remedy that problem and improve the capacity of the river to preserve and enhance the flood control and storm damage prevention interests of the Act.

Pollution Prevention

The sediments in the river contain elevated levels of metals, PAHs, and petroleum hydrocarbons, with PCBs and DDT (and its metabolites) also found frequently. Removing contaminated sediment from the riverbed will remove this contamination source and prevent the continued transport of pollution downstream. The proposed project is therefore presumed to improve the pollution prevention interest by removing a pollution source present in the river channel.

Protection of Fisheries and Wildlife Habitat

Fisheries and wildlife habitat will be improved through the removal of contaminated sediment. As described in Section 2.5 of this SFEIR and Appendix D to the USACE decision document (Muddy River Boston and Brookline, Massachusetts Decision Document and Environmental Assessment, the Sediment Quality and Ecological Risk Evaluation (USACE, 2003)), the river sediments are considered toxic to aquatic organisms.

The proposed dredging and replanting of the riparian zone with a more structurally diverse community with increased species diversity composed of native plantings will improve fisheries and wildlife habitat interests, respectively. Removal of contaminated sediments from the river ecosystem will expose cleaner native sediments, or at worst, less contaminated sediments, thus reducing the adverse impacts to benthic invertebrates and subsequent bioaccumulation and magnification up the food chain. Improved sediment quality is expected to improve conditions for benthic invertebrate survival, growth and reproduction. This will result in an improved benthic community. Also, the resulting improvement in the invertebrate community is expected to result in an improved food source for fish as well as insectivorous wildlife.

The existing riparian zone is dominated by *Phragmites* and/or maintained lawn areas with only a few trees or shrubs present in the Back Bay Fens project sub-area. The proposed riparian zone planting plan uses native plants (trees, shrubs, and herbaceous plants) to replace *Phragmites* and lawn areas resulting in improved structural and species diversity. Increased structural and species diversity will improve the wildlife habitat capacity of the riparian corridor compared to existing conditions (Pianka, 1983).

5.4.3 The Riverway

Wetland resources in the Riverway include Land Under Water, Inland Bank, discrete patches of BVW, BLSF, and Riverfront Area (RFA). The RFA extends 25 feet horizontally from the river to the east (on the Boston side) and 200 feet horizontally on the west (Brookline side) of the river. The following sections describe the existing conditions and interests supported by the resource areas in the Riverway, followed by a discussion of impacts and proposed mitigation for each resource.

5.4.3.1 Existing Conditions and Interests of the Act

The Riverway portion of the Muddy River is an approximately 5,400-linear-foot-(1 mile) long segment of the river bounded by Park Drive to the north and Huntington Avenue (Route 9) to the south. In general, the Riverway is a narrow stretch of the river that is fairly straight with a few sharp bends. The Riverway is located between the Riverway Parkway to the east and the MBTA Green Line trolley tracks to the west, for much of this segment. The following bridged roads cross the river: Longwood Avenue, Netherlands Road and Brookline Avenue.

Phragmites currently occurs along about 30 percent of the Riverway shoreline and occupies about 2.3 acres of the river surface. An additional 0.4 acre is present along embankments up to several feet above the normal water elevation.

The stretch of the river between Huntington Avenue and the Riverway Parkway is a narrow channel bounded by steep slopes. The approximately 450-foot-long segment between Huntington Avenue and the River Street / Riverway Connector is contained within steep banks, approximately 1:1 (horizontal to vertical) slope. These slopes appear to be rock-lined slopes and support weedy vegetation. Fencing is present

around this river segment to prevent pedestrian access to this very steeply sloped bank.

The approximately 915-foot-long stretch of the river between the River Street / Riverway Connector and Brookline Avenue is similarly a narrow stretch of river contained by steep banks that range from 1:1 slopes to 2:1 slopes. The banks are vegetated with trees and shrubs on the Brookline side, and mostly grass cover with some trees and shrubs on the Boston side. Dense *Phragmites* patches are present on the Boston side of the river near Brookline Avenue.

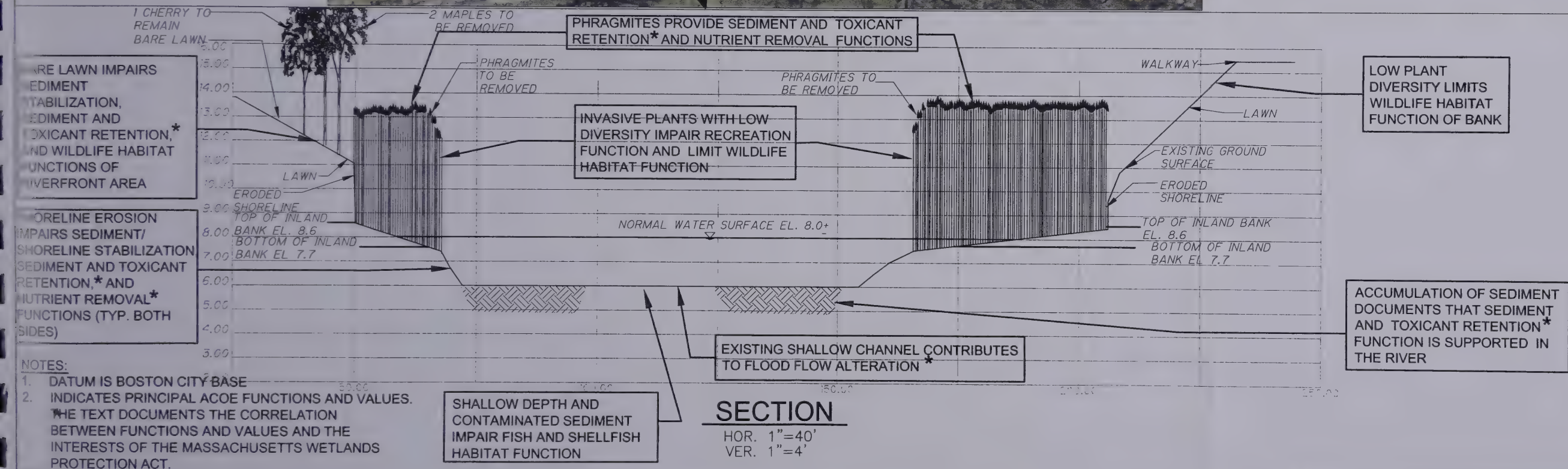
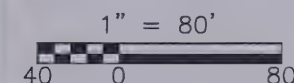
Between Brookline Avenue and Netherlands Road, the river flows in two channels around a small island, commonly referred to as the island area. The southern channel is choked by a dense stand of *Phragmites* throughout the channel. The northerly channel is free of *Phragmites*. Lawn extends to the river's edge in this section of the river with trees and some shrub cover present. Erosion at the normal water elevation is observed in the northerly channel.

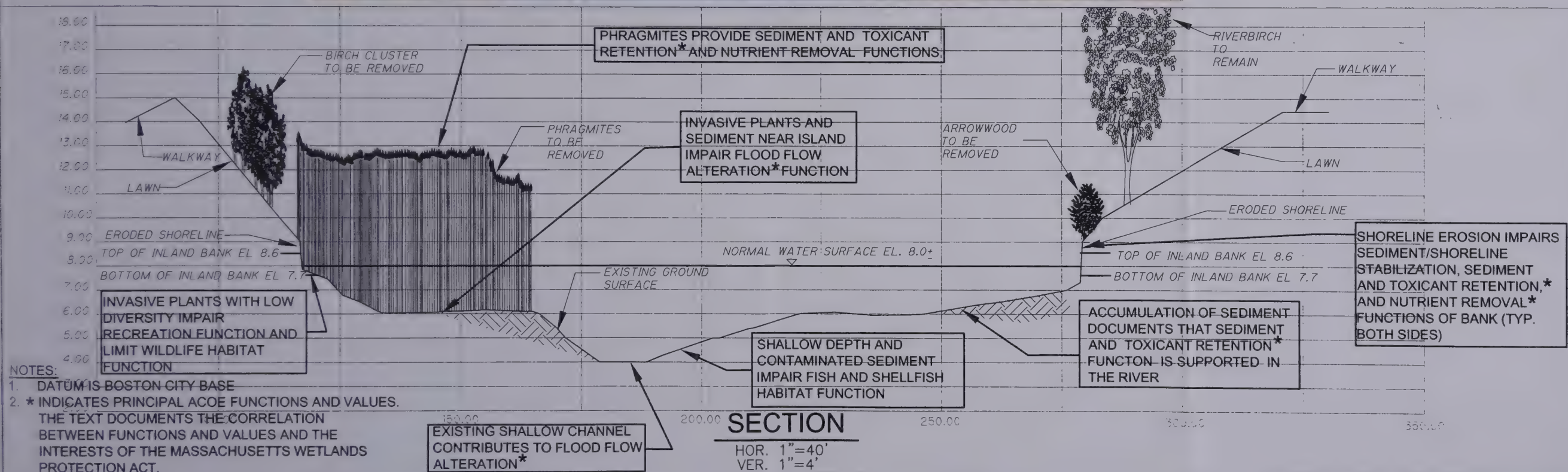
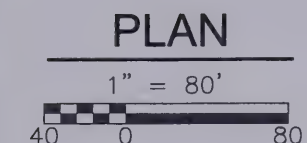
The majority of the Riverway is between the island area and Park Drive. Here, the river flows through the long narrow parkland between the Riverway Parkway and the MBTA Green Line trolley tracks. The river varies in width between approximately 35 feet in the southerly end of this river segment and about 100 feet near the discharge at Park Drive. A walking path is present on both sides of the river; the path is paved on the Brookline side but consists of a stone dust path on the Boston side. The condition of the parkland and riverbank varies along this stretch of the river. In some places there is exposed lawn from the path to the water's edge, with an occasional large tree (specimen tree) that provides rather dense shade during the growing season. In other areas there are tree and shrub masses along the river's edge, bordered by lawn to the walking path. Non-native invasive plant species are present along the river, such as dense patches of Japanese knotweed (*Polygonum cuspidatum*) and buckthorn (*Rhamnus cathartica*). Although much of this stretch is free from *Phragmites*, there are discrete patches of dense *Phragmites* stands within the river. Proposed work in the Riverway is presented on Figures 5-5, 5-6, and 5-7.

Figures 5-12 through 5-14 represent different but typical conditions found along the Riverway. These three cross-sections were selected to present typical existing conditions. Complimentary Figures 5-15 through 5-17 depict the proposed conditions and how these areas will be altered to improve flood control and storm damage prevention, as well as improve wildlife habitat, protection of fisheries, and prevention of pollution interests, further described in Section 5.4.2 above. Please note, erosion at the water's edge, at approximately the ordinary water level, was observed along the entire length of the Riverway.



PLAN





BOSTON PARKS AND RECREATION MUDDY RIVER
RESTORATION PROJECT

Figure No. 5-13

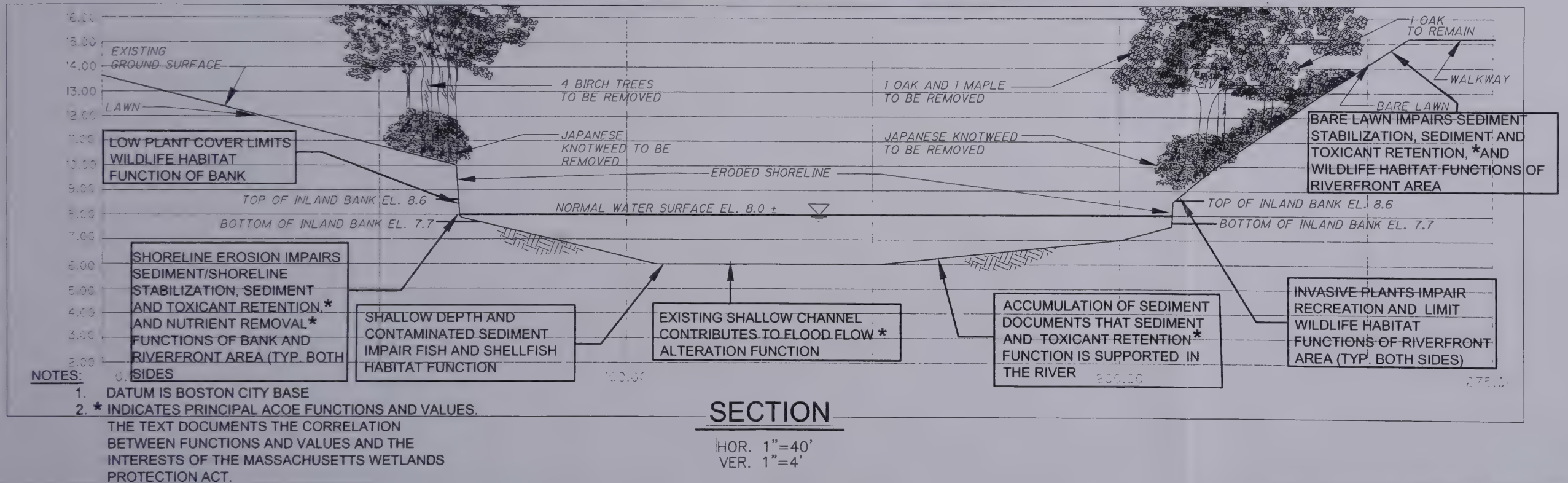
EXISTING CONDITIONS AND REMOVAL PLAN
SECTION NO. 18



PLAN

1" = 80'

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BOSTON PARKS AND RECREATION MUDDY RIVER
RESTORATION PROJECT

Figure No. 5-14

EXISTING CONDITIONS AND REMOVAL PLAN
SECTION NO. 19

Figure 5-12 (cross Section 17) represents an area with *Phragmites* stands on both sides of the Muddy River. The banks are steep and evidence of erosion is observable on both sides of the river. The area between the shoreline and the pathways on both sides of the river supports open lawn. Federally defined wetland functions and values of wildlife habitat, toxicant retention, shoreline stabilization and nutrient removal are limited along the shoreline by the open lawn areas, presence of *Phragmites* and eroded banks. The presence of contaminated sediments in the river impairs fish and shellfish habitat functions. While the presence of *Phragmites* diminishes wildlife habitat, the growth of common reed in the channel contributes to sediment retention, nutrient uptake and flood flow alteration functions.

Figure 5-13 (Cross Section 18) identifies conditions where *Phragmites* is present on the Boston (east) side of the river, and a relatively exposed shoreline with lawn extending to the river is present on the Brookline (west) side of the river. Exposed and eroding bank is present. Despite a dense stand of *Phragmites*, which serves to trap sediment and stabilize the shoreline, erosion is occurring on the bank at the normal water elevation. Similar to the conditions described above, the federally defined functions of wildlife habitat, toxicant retention, shoreline stabilization, nutrient removal, and fish and shellfish habitat are limited in these types of areas due to altered conditions along the river and the presence of contaminated sediment. Likewise, the presence of *Phragmites* in the channel does provide some benefit relative to sediment trapping and nutrient retention. These functions are not present on the west side of the river due to the lack of *Phragmites*.

Figure 5-14 (Cross Section 19) represents a location where there is no *Phragmites* present in or along the river. Eroded banks are observed through dense stands of non-native vegetation – Japanese knotweed (*Polygonum cuspidatum*) which are present along the shoreline. Areas such as this only minimally support federally defined wetland functions and values (of wildlife habitat, toxicant retention, shoreline stabilization, nutrient removal, and fish and shellfish habitat) due to the altered conditions, extensive cover by non-native species and presence of contaminated sediment. The lack of vegetation in the channel in this river section limits sediment trapping, toxicant removal, and nutrient uptake.

As documented in the Draft and FEIRs, the Riverway is identified as providing the federally defined functions and values of flood flow alteration, fish and shellfish habitat, sediment and toxicant retention, nutrient removal, sediment/shoreline stabilization and recreation functions; while the principal functions /values are limited to flood flow alteration, sediment and toxicant retention and nutrient removal. As documented in the DEIR, and presented in Table 5-4 above, there are approximately 9.4 acres (409,465 square feet) of Land Under Water, 0.7 acres (30,490 square feet) of BVW and 12,670 linear feet of Inland Bank (including the islands) in the Riverway section of the Muddy River.

The combination of the various wetland resource areas suggest the Riverway is presumed to be significant to all eight interests of the Act. However, the lack of public

water supplies and shell fisheries result in the following interests being significant in the Riverway: flood control, storm damage prevention, prevention of pollution, protection of fisheries and protection of wildlife habitat.

5.4.3.2 Description of Work in Resource Areas and Proposed Mitigation

The majority of work in the Riverway (i.e. area of alteration) involves dredging Land Under Water to remove accumulated sediment and eradicating *Phragmites* growing within the river channel. The entire bank exhibits erosion at the water line, therefore stabilization of the bank is also proposed. Limited alteration of BVW for restoration of riparian plantings along the river is also proposed.

The following three distinct activities are proposed in the Riverway:

- 1) Removal of *Phragmites* in three locations for flood control;
- 2) Bank stabilization and shoreline restoration, including nuisance vegetation eradication, along the length of the Riverway from Brookline Avenue to Park Drive, for ecosystem restoration; and
- 3) Channel dredging from Brookline Avenue to Park Drive to remove contaminated sediments for ecosystem restoration. This work is proposed to improve the conditions (i.e. positive long-term impacts) of the Riverway.

This project is designed to improve the capacity of the river to support five of the eight interests of the Act, as described below:

Flood Control and Storm Damage Prevention

Flood control and storm damage prevention interests will be improved by removing dense stands of *Phragmites* in three locations (see Figures 5-5 and 5-6). Hydraulic analyses conducted for this project reported that these stands of common reed reduce flood flows and exacerbate flooding along the Riverway. Therefore, their removal will remedy that problem and improve the capacity of the river to preserve and enhance the flood control and storm damage prevention interests of the Act.

Protection of Wildlife Habitat

Bank stabilization and shoreline restoration is proposed to stabilize the eroding bank at the waterline and improve the wildlife habitat (interest) of the Inland Bank, and the Riverfront Area. Field observations report evidence of bank erosion at the waterline along the entire river from Brookline Avenue to Park Drive. Bank stabilization will involve constructing a three- to six-foot-wide planting shelf along the banks in the Riverway. It is anticipated that the shelves will be constructed by the installation of coconut fiber rolls along the bank, similar to the bank stabilization method described above for the Back Bay Fens. In the Riverway, however, the coconut rolls will be placed further away from the bank to create the planting shelf. Soil will be placed between the existing bank and coconut fiber rolls to create the shelf, and soil shelf and the coconut rolls will be planted with emergent and shoreline wetland plants.

Plantings along the shoreline above the top of Inland Bank are proposed to replace non-native species and increase the structural and species diversity along the shoreline. Plant species originally specified by Olmsted will be used on the shoreline to restore the park to its original design. As part of this work, non-native species will be eradicated and replaced with native plants originally specified in the Olmsted design.

Based on the preliminary design that presents a planting shelf of three- to six-foot wide along the Riverway, it is estimated that approximately two feet of the shelf will be above ordinary high water (OHW). Plantings below the OHW are considered to be on the Bank or in Land Under Water, while the upper two feet are considered to be BVW. Based on preliminary design, approximately 0.5 acre (21,860 square feet) of vegetation can be established on the planting shelf along this stretch of the river, based on an average planting shelf width of 4 ½ feet. Approximately 12,150 sf of the total vegetation area is above OHW and is considered to be BVW; and 9,710 sf is below OHW and is considered to be Bank/Land Under Water.

Figures 5-15 through 5-17 present the proposed conditions for the corresponding Figures 5-12 through 5-14, which show existing conditions. Figures 5-15 through 5-17 show the proposed extent of dredging at three representative cross-sections as well as the proposed planting shelves and shoreline plantings.

The proposed condition figures present the ecological benefits resulting from the proposed dredging and shoreline restoration activities in the Riverway.

The removal of contaminated sediment will improve the fish and shellfish habitat conditions. Removal of non-native invasive species and replanting of native species to establish a structurally diverse vegetation community will enhance wildlife habitat of the shoreline and the riparian zone, while the establishment of the planting shelf with dense herbaceous cover will stabilize the bank and replace the positive functions (sediment trapping, nutrient uptake and toxicant retention) provided by *Phragmites*.

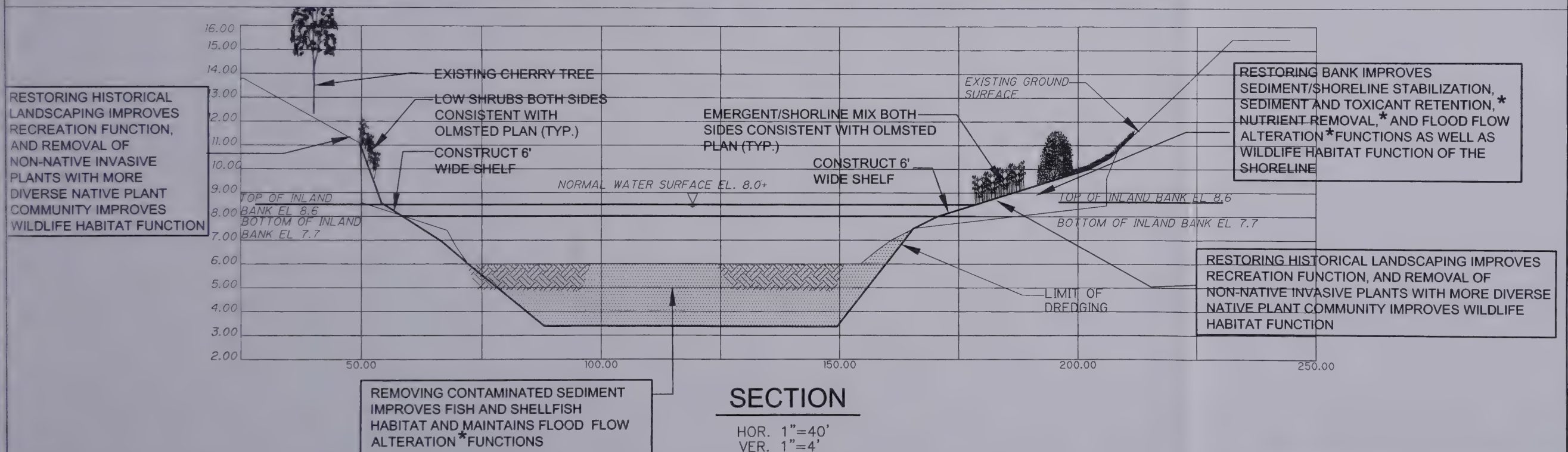
As part of the reconstruction of the Olmsted Plan, lawn will be extended to the river's edge in specified locations to break up the dense shrub and tree plantings and provide views of the river for park users. This will also provide structural diversity to the shoreline plantings. Although areas of lawn to the river's edge may not be viewed as important to wildlife, there are currently significant portions of the shoreline where lawn extends from the pathways to the river's edge. The proposed project will reduce the length of shoreline comprised of lawn from 6,597 linear feet to 4,997 linear feet, a 1,600 linear foot reduction. Table 5-6 compares shoreline features for existing and proposed conditions.



PLAN

1" = 80'

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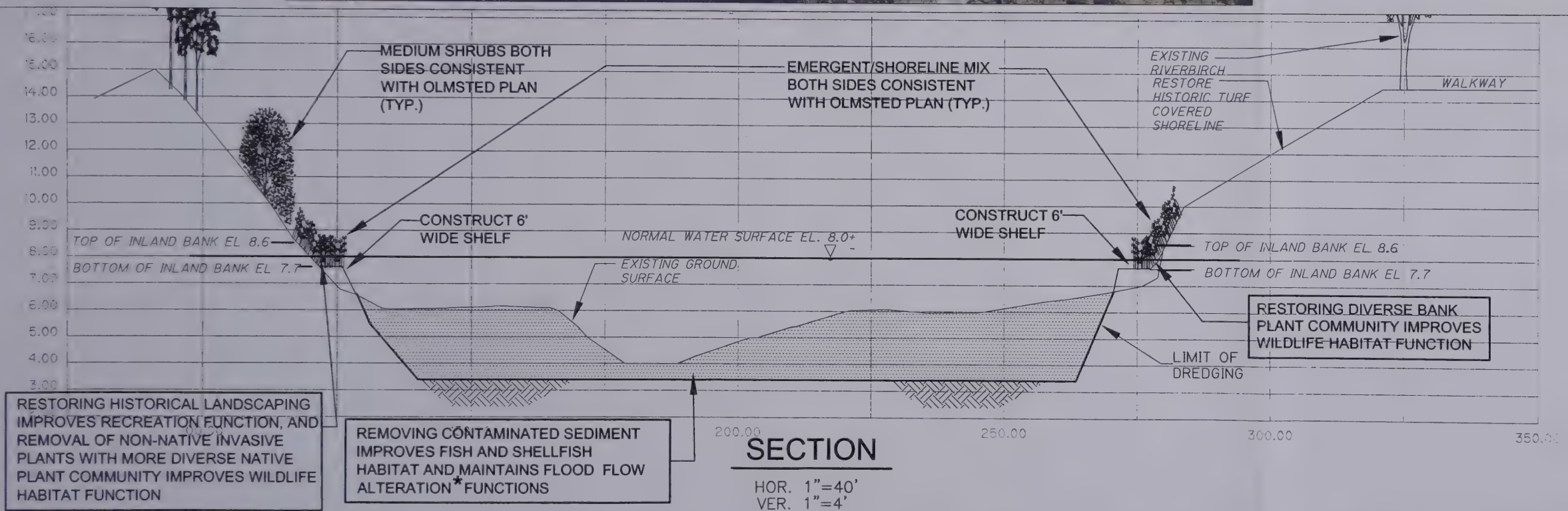
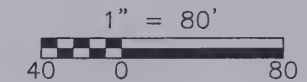
BOSTON PARKS AND RECREATION MUDDY RIVER
RESTORATION PROJECT

Figure No. 5-15

PROPOSED CONDITIONS
SECTION NO. 17



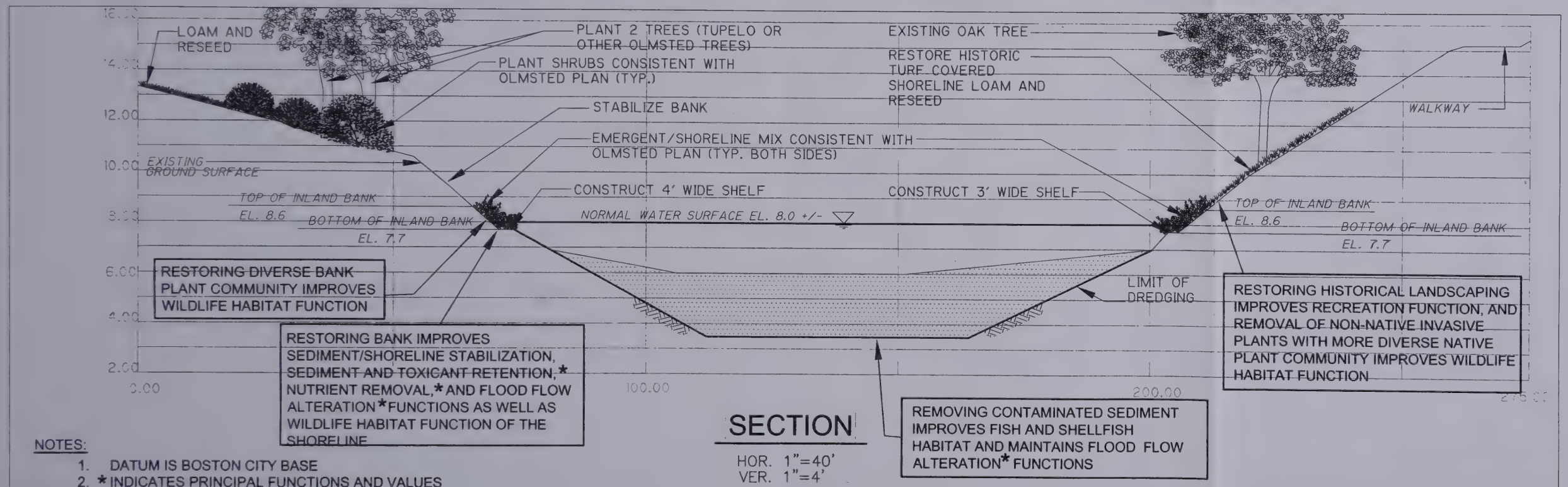
PLAN



BOSTON PARKS AND RECREATION MUDDY RIVER RESTORATION PROJECT

Figure No.5-16

PROPOSED CONDITIONS
SECTION NO. 18



BOSTON PARKS AND RECREATION MUDDY RIVER
RESTORATION PROJECT

Figure No.5-17

PROPOSED CONDITIONS
SECTION NO. 19

Table 5-6
Comparison of Shoreline Features for Existing and Proposed Conditions

Shoreline Feature	Existing Condition (l.f.)	Proposed Condition (l.f.)	Net Change (l.f.)
Lawn (Historic Turf-Covered Bank)	6,597	4,997	-1,600
Shrub Beds 5 feet – 15 feet deep (not including invasive species)	4,176	21,885	+17,709
Invasive Species	14,230	0	-14,230
Wetland Emergent Plants (planted shelf 3 -6 feet wide)	0	26,849	+26,849

Protection of Fisheries

Channel dredging for ecological restoration will improve fisheries habitat by increasing water depth and exposing cleaner sediments in the channel. Deepened channel sections (at locations to be determined by sediment transport modeling in the final design stage) in the Riverway will be established during dredging. These deepened channel sections will be sited in areas where sediment tends to accumulate naturally. There will be no loss of Land Under Water, Inland Bank or BVW as a result of dredging in the Riverway. The dredging and bank restoration activities will improve these resources compared to existing conditions.

Prevention of Pollution

Dredging of the river from Brookline Avenue to Park Drive is proposed to remove contaminated sediments from the riverbed. This project element will serve two purposes: 1) remove contaminated sediments for ecological restoration, and 2) remove a source of pollution from being conveyed downstream throughout the Muddy River and ultimately to the Charles River.

Ecological restoration will be enhanced because dredging will remove contaminated sediments and expose cleaner sediment improving the habitat quality of the Riverway section, especially for benthic organisms and fish present in the river. As documented in ecological risk assessment prepared by the USACE, the sediments in the Riverway are considered toxic to aquatic organisms. Removal of these sediments will improve the habitat for benthic organisms and fish, as well as removing a source of contamination from entering the food chain and migrating to higher trophic levels.

Prevention of pollution will be enhanced by the removal of contaminated sediments from the river. Sediments can be conveyed in the water column and carried downstream during high-velocity storm flows and re-deposited downstream in the Fens, Charlesgate or the Charles River. Increasing the capacity of the channel will also reduce the velocity of flows through the river. A reduction of river velocity will reduce bank erosion and the capacity of the river to convey sediment. Thus, dredging will also prevent pollution by reducing the rate of erosion and reducing the sediment carrying capacity of the river.

5.4.3.3 Limited Project Compliance

As discussed in Section 5.4.1.4 for the Back Bay Fens, the proposed reconstruction and maintenance and flood control elements in the Riverway to be completed as part of the Project can be authorized by the limited project described in 310 CMR 10.53(4) – Resource Area Improvement.

The proposed work in the Riverway (described above in Section 5.4.2.2) will serve to improve the capacity of the wetland resource areas that comprise the Muddy River (Land Under Water, Inland Bank, BVW, BLSF and Riverfront Area) to protect the following interests of the Act: flood control, storm damage prevention, prevention of pollution, protection of fisheries, and protection of wildlife habitat.

The discussion presented in Section 5.4.1.4 above relative to the capacity of the river in the Back Bay Fens to protect and support five of the eight interests of the Act is also applicable to the Riverway section of the river.

5.4.4 The Ponds (Olmsted Park)

5.4.4.1 Existing Conditions and Interests of the Act

Further upstream of the Riverway section of the Muddy River are the three ponds within Olmsted Park. Plant communities along the Muddy River originate from plantings made in the 1890s during construction of the Emerald Necklace parks. Plans called for planting a great variety of trees, shrubs, and herbaceous species. However, much of the intended diversity has been lost over the years due to the introduction of non-native exotics such as Japanese knotweed, purple loosestrife, *Phragmites* and glossy buckthorn.

Ward's Pond

Ward's Pond is an approximately 2.5-acre, nearly circular kettlehole pond. Steep slopes surround the pond on its eastern, southern, and western sides. It receives inflow from Jamaica Pond, natural springs, and one small storm drain. Outflow is through a small stream (Babbling Brook) that flows to Willow Pond. Maximum depth of the pond is about 6 feet. The shoreline was dredged in 1963, but the central portion of the pond has apparently never been dredged. The shoreline is heavily vegetated and undeveloped, except for a walking path. A wooden boardwalk has been constructed along the southern edge of the pond to protect the wetlands and to facilitate access and use of the parkland. Beyond the woodlands to the south is Perkins Street, to the east is the Jamaica Way, and to the west is Pond Avenue. Pond Avenue separates a residential area from Ward's Pond.

Ward's Pond is located in a forested area and the surrounding riparian vegetation consists of trees and shrubs. Species present include red maple, glossy buckhorn, weeping willow, river birch, gray birch, paper birch, northern arrowwood, silky dogwood, tulip tree, and red oak. Some oriental knotweed is also present. Approximately 20% of the pond surface is vegetated with emergent plants. Species

present include swamp loosestrife, jewelweed, narrow-leaved cattail, reed canary grass, blue-flag iris, yellow-flag iris, sensitive fern, and purple loosestrife.

As mentioned earlier, Ward's Pond is connected to Jamaica Pond and receives the majority of its flow from an underground pipe from Jamaica Pond and from seepage. The flow from Jamaica Pond can be controlled by stop logs in a spillway within an underground vault, as well as by a gate valve located within a manhole. The flow rate varies depending on how much water is entering Jamaica Pond. In anticipation of a large storm, the water in Jamaica Pond can be lowered by removing stop logs in the spillway.

The outlet of Ward's Pond (Babbling Brook) has a streambed elevation of about elevation 45.2 feet (Boston City Base), significantly higher than Willow Pond and the Riverway. This higher elevation, along with the pond's high and steeply sloped banks, prevent Ward's Pond from flooding during large storms.

Willow Pond

Willow Pond is approximately 0.6 acres (26,140 square feet) in size. Olmsted modified the existing Willow Pond by constructing outlet controls at the northern end and removing accumulated sediments. The pond receives inflow from the small stream draining Ward's Pond (Babbling Brook) and from one major storm drain – the Chestnut Street Drain. The tributary area to the Chestnut Street Drain is approximately 179 acres. The upper end of the pond is filled in by sediment discharged from this drain. Maximum pond depth is approximately 3.5 feet. The pond was dredged to a depth of 7.5 feet in 1963.

The land that is immediately adjacent to Willow Pond consists of vegetated woodlands and grassy parklands with both paved and unpaved paths. Beyond the woodlands to the east is the Jamaica Way and to the west is Pond Avenue, which separates the residential areas from Willow Pond. The land use beyond the bordering roadways around Willow Pond is residential. Spring Pond, a small tributary pond to Willow Pond, is located to the southeast.

Vegetation along the western side of the pond is forested. The western shoreline is vegetated by a narrow fringe of scrub-shrub wetland and manicured lawn. Species present include oaks, red maple, red-osier dogwood, sweet pepperbush, American bittersweet, weeping willow, oriental knotweed and Virginia rose. Herbaceous species growing along the shoreline or in mudflats within the pond include broadleaf arrowhead, pickerelweed, barnyard grass, jewelweed, purple loosestrife, three-square bulrush, soft-stemmed bulrush, and mannagrass.

The normal pond elevation is maintained by a weir at approximately elevation 15.37 feet (Boston City Base), much higher than the bed elevation of the Riverway, which is between 4 and 5 feet (Boston City Base). Willow Pond receives stormwater from the Chestnut Street Drain and from upstream discharge from Ward's Pond via the Babbling Brook and Spring Pond. The water level in the Riverway during the October

1996 storm was about 19 feet (Boston City Base) and likely caused a backwater effect and some minor flooding of Willow Pond.

Leverett Pond

Leverett Pond is a shallow 7-acre pond with a maximum depth of 5 to 6 feet. The pond receives inflow from Willow Pond (Babbling Brook), the Daisy Field drain, Village Brook, and numerous smaller storm drains. The tributary area to the Village Drain is approximately 2,060 acres, the largest tributary area for storm water outfalls to the Muddy River. Material discharged from the Village Brook Drain has formed an extensive shoal area and a small island near its outlet. This area has been dredged at least three times since the late 1800s, including 1963 when the entire pond was dredged. A section of Babbling Brook between Leverett and Willow Pond is culverted.

Leverett Pond is bordered by grassed parkland along most of its perimeter. There is an earthen bank on the Boston side (east) and a gabion formed shoreline for the majority of the Brookline side (west). Roadways surround Leverett Pond and include Route 9 (to the north), The Jamaica Way (to the east), Willow Pond Road (to the south) and Pond Avenue (to the west). Leverett Pond contains three islands along its western edge. The land that is immediately adjacent to Leverett Pond consists of vegetated woodlands and grassy parklands with paved and unpaved paths. Beyond the woodlands and to the east is the Jamaica Way and to the west is Pond Avenue, which separates the residential areas from Leverett Pond.

The areas surrounding Leverett Pond are vegetated with manicured lawn with a mature tree canopy. In the majority of areas, manicured lawn extends to the pond shoreline, although active planting of shrubs in the past few years along the western shoreline of the pond has replaced the lawn cover in some areas. The tree canopy is comprised of sugar maple, pin oak, sweet gum, black cherry, black oak, northern red oak, and box elder. Shrubs present along the water include sweet pepperbush and northern arrowwood. Purple loosestrife is the most common emergent. A feature unique to Leverett Pond that provides excellent wildlife habitat is the three vegetated islands located on the western boundary of the pond. The islands are vegetated by river birch, eastern poplar, paper birch, white ash, and tupelo.

The normal water surface elevation during dry-weather flow in Leverett Pond is approximately elevation 18 feet (Boston City Base), which is the same elevation as the downstream portions of the Muddy River and the Charles River. Peak elevation in Leverett Pond during the October 1996 storm was approximately 19.4 feet (Boston City Base).

Leverett Pond and Willow Pond provide fisheries habitat function and recreation values. The presence of Three Spine Stickleback in Spring Pond and immediately below the dam in Willow Pond adds additional value to this resource area. The extent of wetlands around the perimeter of these ponds and along the river between the ponds is limited to a narrow band of vegetation along the banks of the ponds and

river. Therefore, the principal wetland functions and values are those functions/values associated with the water bodies and the waterways, because the narrow fringe of wetland vegetation itself provides little opportunity to support the various functions/values. However, pursuant to the Act and the Regulations, the narrow fringe of BVW and all other wetland resource areas are presumed significant to the interests of the Act, as applicable.

Based on the functions and values assessment conducted following the USACE New England District protocol, the most upgradient pond, Ward's Pond, is documented to provide wildlife habitat and recreation. Although the extent of wetland vegetation bordering this pond is more expansive compared to the downgradient ponds, the principal functions are mostly correlated to the pond than to the wetland plant community.

A densely developed urban residential area surrounds all three ponds and the surrounding parks and naturalized areas. This juxtaposition of a naturalized landscape within the urban landscape provides upland habitat for birds and small mammals for which the ponds and river provide an important water source.

5.4.4.2 Description of Work in Resource Areas and Proposed Mitigation

Dredging in Ward's Pond, Willow Pond, and Leverett Pond will improve fish habitat while the proposed landscaping plan depicted in the preliminary design plans presented in Appendix I of the DEIR will improve and/or maintain wildlife habitat, recreation and endangered species habitat as applicable to each pond. Work in Olmsted Park (the Ponds) will not result in the loss of BVW.

Ward's Pond

Principal federally defined wetland functions and values (defined by USACE New England District function and value assessment techniques) of Ward's Pond are wildlife habitat and educational/scenic value. These functions and values will not be lost as a result of this project. Similar to the work in the two downstream ponds, work will occur within Land Under Water and Inland Bank for pond dredging and bank restoration, respectively. Bank restoration will also involve work within BVW. Dredging and bank restoration will not result in the loss of Land Under Water or Inland Bank, as presented in Table 5-5. However, this work will involve re-grading specific portions of the bank and re-establishing a more diverse plant community to restore the Olmsted plan, as described above. This work will alter the existing plant communities within delineated BVW but will not result in a significant loss of BVW area. A final grading plan for the shoreline restoration activities is not completed to date, but it will be presented to the permitting agencies as this project moves forward.

Dredging the pond will remove accumulated sediment from approximately 1.8 acres (78,410 square feet) of the pond. This will expose cleaner sediment and result in deeper water depths in the pond. Exposing less contaminated sediment will improve conditions for benthic organisms that recolonize the newly exposed substrate, and increasing the pond depth will provide expanded habitat for pelagic organisms.

Restoring a more diverse plant community along the pond's bank will involve alteration of the bank to re-grade the bank contours and to remove existing vegetation not consistent with the Olmsted plan. Once preparation work is completed, the bank will be replanted to create a structurally and species diverse plant community along the shoreline. This will improve habitat capacity compared to existing conditions and serve to stabilize the bank.

Construction period mitigation measures described in Section 5.4.1.2 above for the Back Bay Fens will also be used for work in Ward's Pond, Willow Pond, and Leverett Pond. A project-specific Sedimentation and Erosion Control Plan and construction specifications will be prepared as part of the final design of this project. These documents will be forwarded to the environmental permit issuing agencies.

Willow Pond

Principal federally defined functions and values (defined by USACE New England District function and value assessment techniques) provided by Willow Pond are fisheries habitat, endangered species habitat and recreation. Work in Willow Pond is very similar to that proposed in Leverett Pond – dredging and bank restoration.

Willow Pond is extremely shallow, only about two feet deep, and provides limited habitat for fishes and other aquatic organisms. Dredging the pond will vastly improve the fisheries habitat of Willow Pond by providing a deeper habitat compared to existing conditions. Potential impacts and mitigation measures to endangered species habitat and to the population of Three Spine Stickleback present in the pool at the Spring Pond discharge is described in Section 9 of this SFEIR. A slight loss, approximately 0.1 acre (4,355 square feet), of Land Under Water will occur as a result of creating a small island within the pond. This will provide an additional 120 linear feet of Inland Bank associated with Willow Pond. The loss of 0.1 acre (4,355 square feet) of Land Under Water in Willow Pond is compensated by the increased area of Land Under Water resulting from dredging in the Back Bay Fens (1.8 acres/78,410 square feet) and daylighting the river in two sections in the Back Bay Fens (1 acre/43,560 square feet) resulting in a net increase of 2.7 acres (117,610 square feet) of Land Under Water within the Muddy River system.

Construction period mitigation measures will be the same as for Ward's Pond, see above.

Leverett Pond

Principal federally defined functions and values (defined by USACE New England District function and value assessment techniques) provided by Leverett Pond are fisheries habitat and recreation. The majority of work within wetland resource areas in Leverett Pond will occur within Land Under Water for dredging and Inland Bank for restoration of Olmsted plantings. This work will not adversely affect the principal functions and values of the pond. Dredging the pond will remove accumulated sediment from approximately 6 acres (261,360 square feet) of the pond. This will expose cleaner sediment and result in deeper water depths in the pond.

Exposing less contaminated sediment will improve conditions for benthic organisms that re-colonize the newly exposed substrate, and increasing the pond depth will provide expanded habitat for pelagic organisms.

Restoring a more diverse plant community along the pond's bank will involve minor re-grading of portions of the bank contours and removal of existing vegetation not consistent with the Olmsted plan. Once the preparation work is completed, the bank will be replanted to create a structurally diverse and species-rich plant community along the shoreline. This will improve habitat capacity compared to existing conditions and serve to stabilize the bank. No loss of Inland Bank will occur as a result of this work. The proposed planting work will occur within the small pockets of BVW present along the shoreline. The planting work will replace existing plants in the pockets of BVW with wetland species consistent with the Olmsted design. Based on preliminary design, it is anticipated that approximately 0.1 acres (4,340 square feet) of new BVW can be established along the Leverett Pond shoreline.

Construction period mitigation measures will be the same as for Ward's Pond, see above.

5.4.4.3 Limited Project Compliance

As discussed in Section 5.4.1.4 for the Back Bay Fens and Section 5.4.2.4 for the Riverway, the proposed reconstruction and maintenance and flood control elements in the Ponds (Olmsted Park) to be completed as part of the Project can be authorized by the limited project described in 310 CMR 10.53(4) – Resource Area Improvement.

The work in the Olmsted Park will include dredging the three ponds – Ward's Pond, Willow Pond, and Leverett Pond – to restore the ponds to their historic depths and restore the intended natural habitats of each. This work will improve the capacity of these ponds to protect the following interests of the Act:

- Prevention of pollution,
- Protection of fisheries, and
- Protection of wildlife habitat

The project will have no effect, positive or negative, on flood control, storm damage prevention, land containing shellfish; and since there are no water supplies in the project area, the project will have no effect on the protection of public or private water supplies nor on the protection of ground water supplies. The following paragraphs discuss how the proposed work support the three interests listed above.

Prevention of Pollution

Dredging the three ponds within Olmsted Park will remove the accumulated sediment from each pond to restore the original Olmsted design. The USACE reported that sediments in the river and ponds, except Ward's Pond, are contaminated to levels that are deleterious to benthic invertebrates and fish (USACE,

2003). A certain amount of sediment is re-suspended during storm events due to increased water flow velocities, thus transporting pollution from the ponds downstream to other river sections. Removing contaminated sediment from the ponds will remove this contamination source and prevent the continued transport of pollution throughout the river. Therefore, the Project is presumed to improve the prevention of pollution interest by removing a pollution source present in the river channel.

Protection of Fisheries and Wildlife Habitat

Fisheries and wildlife habitat will be protected through the removal of sediment via dredging. As described in the Sediment Quality and Ecological Risk Evaluation (USACE, 2003), the river and pond sediments, except for Ward's Pond, are considered toxic to aquatic organisms. That assessment utilized multiple lines of evidence to evaluate sediment quality and potential effects on aquatic organisms.

The sediment is likely to adversely affect benthic organisms and fish at all stations except Ward's Pond, based on comparison of river sediment data to sediment quality guidelines and bioassay test results. Removal of these sediments will improve the benthic habitat and coincidentally improve conditions for fish present in the ponds. Improved benthic habitat will improve conditions for the reproduction, survival and growth of invertebrates, and provide food sources in the ponds. Also, contaminated sediment can adversely affect the development of demersal eggs and in turn adversely affect fish populations. Removal of contaminated sediment is likely to improve the fish populations present in the ponds.

Willow Pond, in particular, has become so filled in with sediment that the water is only about two feet deep across the pond, and the aquatic habitat is nearly nonexistent. Dredging of this pond will restore pond depths to six to eight feet deep, restoring the aquatic habitat of Willow Pond, and allowing fish populations in the pond to rebound.

Food chain modeling identified a risk to avian populations at all stations. Risks are identified for insectivorous birds, feeding on insects that emerge from aquatic larval life stages. Therefore, dredging the ponds will remove this risk to avifauna that feed on organisms that inhabit Leverett and Willow Ponds.

The proposed planting plan (See DEIR Appendix I) utilizes native plants (trees, shrubs and herbaceous plants) to restore the Olmsted Park to its originally designed condition. This will improve structural and species diversity within Olmsted Park. Leverett Pond in particular has decreased wildlife habitat value due to the lawn areas that extend to the shoreline. Increased structural and species diversity will improve the wildlife habitat capacity (Pianka, 1983) of the park compared to existing conditions.

5.5 *Phragmites* Removal

5.5.1 Introduction

Proposed work includes removal of *Phragmites* in the lower Back Bay Fens and the Riverway to remove the flow restrictions caused by the *Phragmites* stands, as well as to eradicate this nuisance invasive plant species throughout the Muddy River corridor.

5.5.2 Natural History of *Phragmites*

Phragmites australis (common reed) is a tall perennial rhizomatous grass. *Phragmites* has a worldwide distribution as it is found on every continent except Antarctica. *Phragmites* produces a large number of seeds per plant and also spreads vegetatively by a vigorous system of rhizomes and stolons. These reproductive strategies cause *Phragmites* to be an invasive plant forming dense stands of monospecific communities. Since *Phragmites* is invasive, there is some debate over whether it is native to this area. There is some evidence that *Phragmites* is indigenous to North America. *Phragmites* was identified in cores of 3000-year old peat from tidal marshes in Connecticut and *Phragmites* remains dating from 600 to 900 A.D. were found during archaeological investigations in southwestern Colorado (see review by Lapin and Randall, 1993). It has been considered a nuisance plant in the U.S. since the 1940s, and because of that there has been some discussion that a non-native strain of *Phragmites* may have been introduced from Europe in the early 1900s. The invasive growth form may be associated with this exotic type (Cronk and Fennessy, 2001).

Phragmites typically inhabits freshwater and brackish wetlands throughout our area. It occurs in disturbed areas as well as pristine sites forming near-specific stands by out competing other plants. Human disturbance of sites may promote its growth. Increases in *Phragmites* are also thought to be promoted from increases in soil salinity from road deicing salts, increases in nutrient concentrations (in particular, nitrates), alteration of natural hydrologic regimes, and dredging.

Phragmites becomes established through dispersal of seeds or pieces of viable stems called rhizomes. Established stands grow mainly from sending up new shoots each spring from existing rhizomes, or from aboveground runners called stolons. The plants flower and set seed generally between July and September. In our area, seeds are dispersed between November and January by wind or via birds that nest in the reeds. Human disturbance may favor *Phragmites* seed establishment. During a construction activity in and around wetlands, 69 rhizome buds were removed from the treads of a tracked vehicle working in a *Phragmites* dominated community (Ailstock, *et al.*, 2001).

5.5.3 *Phragmites* Functions and Values and Interests of the Act

A literature review was conducted to identify the wetland "functions and values," as defined by the USACE, of *Phragmites*-dominated wetland plant communities. Wetland functions are self-sustaining properties of a wetland ecosystem and include all the processes necessary for the self-maintenance of the wetland ecosystem such as

production and nutrient cycling. Wetland values are based on the societal values of these wetland functions. The USACE recognizes 13 wetland functions and values as discussed in Section 5.4.1.

The following four functions/values are associated with the *Phragmites* dominated wetlands along the river:

- Sediment/Toxicant Retention;
- Nutrient Removal/Retention/Transformation;
- Sediment/Shoreline Stabilization; and
- Wildlife Habitat;

5.5.3.1 Sediment/Toxicant Retention

This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens.

Sediment Trapping

Studies have found that *Phragmites* can be an important soil stabilizer and may have an application as a nutrient sink for treating wastewater prior to release (Ailstock, *et al.*, 2001). *Phragmites* is commonly used for sediment trapping in subsurface flow wetlands in Europe (Cronk and Fennessy, 2001). However, its invasive characteristics prevents its use in this fashion in North America. The dense stands of persistent stalks also aid in the trapping of sediment carried in water flowing through reed stands.

Currently, there are approximately 1.65 acres (72,000 square feet) of *Phragmites* in the Riverway channel below ordinary high water. The majority of the *Phragmites* coverage is found in two places, the Back Bay Yard (32,290 square feet) and at Netherlands Road (19,170 square feet) for a total of 1.18 acres (51,460 square feet), or 71.5% of the total *Phragmites* coverage in the Riverway. The extent of *Phragmites* in these two areas has blocked the channel to such an extent that these stands obstruct flood flows. The removal of *Phragmites* at these two locations is needed for flood relief, as described in Section 7 of this SFEIR. As a flood relief project, the removal of nuisance *Phragmites* is considered a limited project.

The balance of *Phragmites* cover, approximately 0.47 acre (20,540 square feet), is found in several discrete patches at various locations along the Riverway. Removing these patches of *Phragmites* is proposed as part of the environmental restoration activities by establishing a more diverse plant community along the river. These *Phragmites* stands serve to trap sediment and retain toxicants, as described above. The density of plant stalks act like a filter – slowing water flow through the dense stands and trapping sediment within the *Phragmites* stands. The effectiveness of *Phragmites* to filter sediment from the water column is augmented by the fact that *Phragmites* stalks persist after dormancy, and thus the filtering function is present nearly year round.

The effectiveness of *Phragmites* to trap sediment is clearly evident at the Back Bay Yard and Netherlands Road areas where the accumulation of sediment and the spread of *Phragmites* has restricted the channel to such an extent that these stands nearly block the channel and obstruct river flow and now must be removed to alleviate flooding.

Establishing a dense wetland plant community below ordinary high water on "planting shelves" in the Riverway is proposed to mitigate for the loss of the sediment trapping and toxicant retention functions currently provided by *Phragmites* in the Riverway. The planting shelves on each side of the river will be 3 to 6 feet wide and will be planted with emergent and wetland plant species, see Figures 5-15, 5-16, and 5-17. Plantings above the ordinary high water line are considered BVW replication, while plantings below the ordinary high water line are considered Bank or Land Under Water restoration.

On average, about 2.5 feet of the shelf will be below the ordinary high water. During final design the width of the shelves will be increased, if possible. The Riverway is approximately one mile long. A total of approximately 10,060 linear feet (excluding the banks of the small islands in the Riverway) of planting shelf will be constructed in the Riverway (4,900 linear feet on the easterly bank and 5,160 linear feet on the westerly bank). Assuming an average width of the shelf below ordinary high water will be 2.5 feet, there will be approximately 25,150 square feet of aquatic and emergent vegetation planted below the ordinary high water line in the Riverway. This is proposed to replace the loss of 20,540 square feet of *Phragmites* removed below ordinary high water for ecological restoration. The planting shelf will increase the wetland plant cover along the Riverway by 4,610 square feet, a 22% increase in plant coverage, exclusive of the flow-restricting *Phragmites* stands.

The design intent is to establish a diverse wetland plant community along the river bank. Selecting plant species for the Muddy River restoration project is somewhat limited because of the requirement to meet historic restoration standards by selecting plants from the palate of species originally specified by Olmsted in his design. Therefore, the design of the wetland plant shelves involves selecting species that perform the desired functions from the Olmsted list. The list of available wetland plant species and their wetland indicator status is presented in Table 5-7. To achieve this goal a variety of species will be utilized from the Olmsted plant list that includes the following emergent and shoreline plants listed in that table.

**Table 5-7
Wetland Tree, Shrub and Ground Cover Plantings for Habitat and Historic
Restoration**

Common Name	Latin Binomial	Wetland Indicator Status
Trees		
Red maple	<i>Acer rubrum</i>	FAC
Tupelo	<i>Nyssa sylvatica</i>	FACW+
Gray Birch	<i>Betula populifolia</i>	FAC
Shrubs		
Speckled Alder	<i>Alnus rugosa</i>	FACW+
Smooth Alder	<i>Alnus serulata</i>	OBL
Red Chokeberry	<i>Aronia arbutifolia</i>	FACW
Button Bush	<i>Cephalanthus occidentalis</i>	OBL
Sweet Pepperbush	<i>Clethra alnifolia</i>	FAC+
Silky Dogwood	<i>Cornus amomum</i>	FACW
Red-Osier Dogwood	<i>Cornus stolonifera</i>	FACW+
Witch-hazel	<i>Hamamelis virginiana</i>	FAC-
Winterberry	<i>Ilex verticillata</i>	FACW+
Spicebush	<i>Lindera benzoin</i>	FACW
Swamp Azalea	<i>Rhododendron viscosum</i>	OBL
Common Elderberry	<i>Sambucus canadensis</i>	FACW-
Withe-rod	<i>Viburnum cassinoides</i>	FACW
Arrow-wood	<i>Viburnum dentatum</i>	FAC
Nannyberry	<i>Viburnum lentago</i>	FAC
Emergent and Shoreline Plants		
Blue-Joint Grass	<i>Calamagrostis canadensis</i>	FACW
Jack-in-the-Pulpit	<i>Arisaema triphyllum</i>	FACW
Turk's Cap Lily	<i>Lilium superbun</i>	FACW
St. John's Wort	<i>Hypericum virginicum</i>	FACW
Forget-me-nots	<i>Myosotis scopioides</i>	FACW
Cardinal Flower	<i>Lobelia cardinalis</i>	FACW
Broadleaf Arrowhead	<i>Sagittaria latifolia</i>	OBL
Pickerelweed	<i>Pontederia cordata</i>	OBL
Blue Flag	<i>Iris versicolor</i>	OBL
American Burreed	<i>Sparganium americanum</i>	OBL
Soft-stemmed Bullrush	<i>Scirpus validus</i>	OBL
Three Square Bullrush	<i>Scirpus pungens</i>	OBL
Sweet Flag	<i>Acorus calamus</i>	OBL
Water Smartweed	<i>Polygonum amphibium</i>	OBL
Arrow Arum	<i>Peltandra virginica</i>	OBL
Water Plantain	<i>Alisma plantago-aquatica</i>	OBL
Marsh-mallow	<i>Hibiscus moscheutos</i>	OBL

The final plant selection from the above list will be made during final design. The species listed above are perennial graminoids and forbs, and the morphology of the majority of these species includes a stout and/or firm stalk (Gleason and Cronquist, 1963; Gray, 1950) so that the densely planted shelf will effectively filter sediment during the growing season. A number of the species listed above form dense stands and persist throughout the dormant period – e.g. blue-joint grass, American burreed, soft-stemmed bullrush, and three square bullrush. The inclusion of these plants within the planting shelf will provide filtering capacity during the dormant season. The design of the shelves is for a diverse wetland plant community and therefore monospecific stands of the most effective filtering species are not proposed. Although the effectiveness of the plant communities on the shelves may not be equal to that of monospecific stands of *Phragmites* at the various locations along the Riverway, the greater extent of plantings below ordinary high water (i.e. along the entire channel vs. discrete patches) is provided to off-set this difference.

Toxicant Retention

Similar to the filtering function, *Phragmites* also can sequester contaminants carried in urban runoff. The planting shelves are also designed to mitigate for the loss of this function. The physiology of *Phragmites* also allows it to grow in somewhat saline and/or contaminated waters, and to take up some contaminants. The uptake of contaminants and nutrients is more correctly a seasonal removal of these constituents, because after the plants go dormant and above-ground biomass falls to the soil surface and begins to decay, these constituents are released to the environment as the plant tissues decay. As the plants decay, some of the plant matter and its constituents can be released into the water and carried downstream, while the balance of old plant matter remains in the stand developing a deep litter layer within the stand. This litter is broken down by soil microbes and transformed via microbial activity and chemical reactions or bound in the underlying litter/sediment layer. The release of contaminants from decaying plant matter often occurs during winter or early spring thus releasing these constituents during the non-growing season, a time that is less harmful to aquatic flora and fauna.

Literature is not available for all of the “Olmsted” species relative to contaminant uptake, but the USDA does report that soft-stem bulrush is effective at reducing pollutant loads conveyed in urban runoff (USDA, undated). As reported in Kadlec and Knight (1996) a constructed meadow/marsh/pond complex in New York showed significant removal rates for various metals including cadmium, chromium, copper, iron, manganese, nickel and zinc. Although the removal rates in this reference wetland complex were affected by residence time, this data shows that marsh/wet meadow plant communities have the capacity to take up contaminants carried in the water column.

Macrophytes are the most visible component of a vegetated wetland system and do serve to immobilize pollutants to a certain degree. However, the microbes and soil are equally, if not more, important to water quality improvements. Microbial communities in wetlands include bacteria, fungi, and algae which are important to

nutrient cycling and pollutant transformations (Kadlec and Knight, 1996). Macrophytes are important to water quality improvements as they utilize nutrients and can take up certain contaminants. Perhaps the most beneficial functions macrophytes provide is additional surface area on which microbial species can grow increasing microbial densities per unit area of wetland. Therefore, the development of dense plant communities below ordinary high water will replace the plant media for microbes lost as a result of *Phragmites* removal. Due to the physiology of certain wetland/aquatic plant species, oxygen is transported to roots and can escape into adjacent soils providing a mechanism to introduce oxygen into soils in the support of microbial communities in flooded soils. The proposed shelves will provide additional soil media for the development of microbial communities compared to existing conditions.

In addition to microbial communities, wetland soil chemistry plays an important role relative to the treatment capacity of wetland systems because they have a high trapping efficiency for a number of chemicals. The redox potential of wetland soils decreases with depth as the oxidized surface layer is underlain by increasingly reduced and anaerobic soil conditions. The range of oxidation states in wetland soils makes them an ideal environment for chemical transformations.

The proposed wetland planting shelves will involve the placement of soils above and below the ordinary high water lines depicted in Figures 5-15, 5-16 and 5-17. The addition of these soils and the plants to be established in the soils will increase the soil surface area and volume (in the soil and plant media) available for the growth of microbial communities and the development of chemically reactive soils. Based on the assumption that approximately 2.5 feet of the planting shelves will be below ordinary high water, approximately 0.57 acre (25,015 square feet) of new soil surface area will be established as part of the ecological restoration activities. Therefore, the addition of soil media for microbial communities and chemically reactive soil to the Riverway system is another mechanism to mitigate for the loss of contaminant uptake resulting from the removal of *Phragmites* from below the ordinary high water line.

5.5.3.2 Nutrient Removal/Retention/Transformation

This function considers the effectiveness of the wetland as a trap for nutrients in runoff water from surrounding uplands or contiguous wetlands and the ability of the wetland to process these nutrients into other forms or trophic levels. One aspect of this function is to prevent ill effects of nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries.

Emergent vegetation such as *Phragmites* has a large network of roots and rhizomes to store nutrients (nitrogen and phosphorus) in perennial tissues. Emergents take up nutrients from the soil pore water establishing a gradient between the water column and the soil which improves overall nutrient retention. Common reed has high nutrient uptake capacity primarily due to its large size. Studies of uptake of metals, which are essential micronutrients for living organisms, found that *Phragmites* accumulates iron, lead, zinc, cadmium, and copper in the roots and rhizomes with

some indication that the translocation of the metals to the shoots is impeded (Cronk and Fennessy, 2001).

Removal of the *Phragmites* stands may diminish the nutrient removal capacity of the Muddy River compared to existing conditions. Nutrient removal by plant uptake is a temporary removal or sequestering of nutrients during the growing season, only to be released after the plant matter decays in the river. So removal of the *Phragmites* stands will also serve to remove a nutrient source. The sediments also contain significant percentage of organic matter, and their removal will serve to remove another nutrient source present in the sediments.

Much of the nutrient uptake function performed by *Phragmites* is correlated to its primary productivity rate and growth of above-ground biomass. The uptake of significant amount of nutrients and water is needed for the growth and maintenance of this large plant. The ecological restoration activities associated with this project will require the removal of approximately 20,540 square feet of *Phragmites* from the Riverway, below ordinary high water. To mitigate for the loss of this beneficial function performed by *Phragmites*, approximately 25,150 square feet of planting shelves will be established on the river banks, and these shelves will be planted with a diverse plant community below the ordinary high water line. Although the proposed suite of native species selected for planting on the shelves will likely not have the same nutrient uptake rate as *Phragmites*, on a per plant or area basis, the increased plant coverage is proposed to offset this difference.

Similar to the discussion above regarding contaminant retention and transformation, the microbial communities and soil chemistry of flooded soils/sediment are important in the nutrient removal/retention and transformation function of wetland systems. Therefore, the proposed planting shelves provide additional volume/area of new soils below ordinary high water for increased reactive soil media within which nutrients can be retained and transformed. Also the new soil and the introduced macrophyte stands will provide new media within and on which microbial communities can develop. The combination of additional soil, dense plantings and the microbial communities that will develop as a result of the planting shelves will serve to mitigate for the loss of nutrient removal, retention and transformation performed by existing *Phragmites* in the Riverway.

5.5.5.3 Sediment/Shoreline Stabilization

This function considers the effectiveness of a wetland to stabilize streambanks and shorelines against erosion.

The wetlands in the Riverway corridor consist of a complex of dense stands of common reed at specific locations, intermixed with trees and shrubs along the river's edge. The vegetation along the river banks serves to stabilize the shoreline and trap sediment. The *Phragmites* stands are effective at sediment stabilization due to their dense growth form and persistent stalks.

The ability of *Phragmites* to trap sediment is well-documented in the Muddy River by the extent to which these stands have expanded into the channel and reduced the channel carrying capacity. The river channel is actually blocked in several locations; near Back Bay Yark and in the Island Bridges area near Netherlands Road and Brookline Avenue. Stands of *Phragmites* along the river benefit water quality by trapping sediment but the accumulated sediments and the growth pattern of *Phragmites* have together decreased the effective flood flow capacity of the river channel and is a contributing factor to area flooding. Hydraulic analyses conducted for the project demonstrate that removal of the *Phragmites* stands will have a positive effect on the ability of the river to convey flood flows and protect the storm damage prevention and the flood control interests of the Act.

Replacement of *Phragmites* with plant species from the Olmsted planting list will serve to stabilize the soils. The function of sediment and shoreline stabilization is correlated to the root mass and morphology of the plant species. Plant species with well-developed or dense root systems are more effective at stabilizing sediments and shorelines than species with less developed root systems. A number of the plant species available for planting on the shelves are reported to effectively stabilize soils. These plants include; blue-joint grass, Jack-in-the-pulpit, American bur-reed, blue flag, soft stemmed bulrush, and three square bulrush (Redington, 1994; and USDA, undated).

In the Riverway a significant proportion of the bank, both north and south sides of the channel, are undercut and show significant signs of erosion. Currently, approximately 3,535 linear feet (1,555 linear feet on the westerly bank and 1,980 linear feet on the easterly bank) of the 10,060 linear feet of bank in the Riverway is occupied by *Phragmites*. This represents only 35% of the shoreline in the Riverway.

The proposed planting shelves will be constructed for the entire length of the River on both the northerly and southerly shorelines. The shelves will be established with coconut fiber rolls to define the outer limit and the space between the coconut roll and the existing bank will be filled with soil. The soil shelf will be planted with a variety of shoreline and emergent plant species to stabilize the soils. Construction of the shelves will stabilize the entire 10,060 linear feet (100%) of shoreline in the Riverway, and will more than compensate for the shoreline stabilization function currently performed by *Phragmites* present on only 35% of the shoreline.

5.6 Constructed Deepened Channel Sections

The flood control improvements include deepened channel sections in the riverbed to prevent the rapid loss of flow capacity. These deepened channel sections will be located in areas where sediment tend to accumulate naturally. The number, size and location of these deepened channel sections will be determined based on sediment transport studies to be completed during the USACE's design stage. It is anticipated that certain deepened channel sections may be located at points downstream of major discharges to the river, where sediments have tended to accumulate in the past.

It is anticipated that the deepened channel sections of the river are permissible under the Act and regulations. It is expected that any future dredging activities for either the deepened channel sections, the flood control channel or environmental restoration will likely require state environmental review via the issuance of a Water Quality Certificate and local Conservation Commission approval. However, we understand no further federal review pursuant to Section 404 of the Clean Water Act would be required.

5.7 Construction Period Mitigation Measures

The first step to minimize impacts is to select the least damaging dredging technique. Use of hydraulic dredging avoids many of the potential impacts to waters and wetlands associated with mechanical dredging. Additional measures to minimize impacts during dredging are presented below:

- Deploy silt curtains with oil-absorbent booms to enclose the work area. Silt curtains will not be deployed across the river, so as to maintain a passage for fish and other aquatic organisms through the work area.
- Silt curtains and oil absorbent booms will be inspected daily and repaired as needed.
- Possible seasonal restrictions on dredging (i.e., no dredging will occur between March 15 and June 15).
- A water quality monitoring program will be developed and implemented for the duration of the in-stream work. The details of the monitoring plan will be developed in consultation with state (DEP) and federal (USACE and EPA) as the design develops further. During final design, river segment-specific monitoring programs will be developed based on the types and concentrations specific to each. The segment-tailored monitoring programs will be submitted to applicable state and local agencies for review and approval prior to initiating dredging activities.
- The monitoring and analytical results will be attached to the weekly Environmental Inspection Report to DEP;
- Prior to the start of in-stream work, any polymer proposed for use will be identified and information about its aquatic toxicity shall be forwarded to DEP;
- Any oily material, as evidenced by a visible sheen, released during dredging will be promptly collected and reused or disposed of at a licensed facility;
- Dewatering and reuse conditions per DEP Interim Policy Comm-94-007 and Comm-97-001 will be followed; and
- All disturbed or exposed soil surfaces will be temporarily stabilized within 30 days of disturbance or exposure, with hay, straw, mulch or any other protective

covering and/or method approved by the U.S. Department of Agriculture, Natural Resource Conservation Service, to prevent erosion.

5.8 Wetland Mitigation and Monitoring

5.8.1 Replication and Restoration

5.8.1.1 Introduction

The locations of wetland replication and restoration areas are shown on Sheets 1 through 34 located in the FEIR Section 12. Note that areas of wetland restoration are areas of delineated BVW consisting of stands of non-native plant species that will be replanted with native wetland species from the Olmsted plant list. Replication or replacement wetlands are plant communities that will be established where no BVW currently exists. The location and extent of replication and replacement wetlands shown on the above-referenced figures are preliminary. Final location and extent will be determined based on final grading plans to be developed during final design. Restoration of the riverbank plant community with a more diverse community comprised of native plantings, as described above in Sections 5.4 and 5.5, plus other project components and mitigation measures, will result in no net loss of wetland functions or values compared to existing conditions.

Restoration and replication of wetland plant communities are proposed along the banks of the Muddy River, as shown on Sheets 1 through 34 in the FEIR Section 12, as well as being tabulated in Tables 5-4 and 5-5 of this SFEIR. Typical cross sections of the river at 10 locations are presented in Sheets 35 through 45 in the FEIR Section 12. The proposed restoration and replication areas are designed within the same elevation range on the river banks as existing wetland plants. This is expected to provide sufficient hydrologic conditions in the restoration and replication areas to support the wetland plants. The final planting plans will be prepared during the USACE's final design and presented in the permit applications for review and approval by the environmental issuing authorities.

5.8.1.2 Construction Methods

Topsoil for use in the wetland restoration and replication area will be organic rich loam. The soil will be friable and capable of promoting and supporting healthy plant growth. Manufactured organic rich loam is acceptable for use. Organic rich loam will have a pH of around 5.5 and will be classified as sandy loam, loam, or sandy clayey loam. Organic content will range between 8 - 10 % as determined by loss on ignition of moisture free test sample oven dried to a constant weight at a temperature of 100 degrees Centigrade.

Natural topsoil in New England typically has an organic content of 3 - 5 %. Therefore, soil amendments will be needed to adjust soil to manufacture an organic rich loam. Organic amendments for use on this project to create an organic rich loam will include compost - defined as a stable, humus-like material produced from the aerobic decomposition of organic residues. Organic residues may include biosolids as well as yard wastes, and agricultural wastes. The compost will be capable of supporting

plant growth in conjunction with addition of fertilizers and other amendments as applicable. The compost will contain at least 40% organic matter (dry weight) and 100% of the material should pass a 3/8-inch (or smaller) sieve. Debris such as metal, glass, plastic, wood (other than residual chips) asphalt and masonry shall not be visible and should not exceed 1% dry weight of the compost.

Organic rich topsoil will be used to create finish grades in the wetland replication area to a depth of 6 to 12 inches. The toe-of-slope, where necessary, will be stabilized with a stone toe, gabion structure, coir fascine, or similar toe-stabilizing material. Where stone is utilized, filter fabric will be installed to prevent the loss of soil through the stone toe protection.

After soils are placed and compacted as specified, the wetland restoration/replication areas will be planted per the final landscaping plan. After planting of trees, shrubs and ground cover is completed, a woven pervious weed barrier fabric will be installed over the disturbed soils and mulch will be installed to stabilize the soils.

5.8.1.3 Wetlands Monitoring

The wetland restoration and replication areas will be required to meet the performance standards for wetland replacement areas as defined in the Act [310 CMR 10.55(4)(b)(1-7)]. These standards require the area to support at a minimum 75% cover by native wetland plant species at the end of two complete growing seasons. The monitoring protocols will be developed pursuant to the DEP's Wetland Replication Guide (2002) and presented in the Notices of Intent prepared for this project.

After planting is completed, the wetland restoration and replication areas will be inspected to ensure that the work was completed in accordance with the plans and specifications with regard to number of plants, plant species, size and location. Any corrective measures identified during the initial inspection will be addressed.

Periodic inspections of the restoration and replication areas as specified in the permit conditions (Orders of Conditions and Water Quality Certifications) will be conducted to ensure that the performance standards of 310 CMR 10.55 are met. The inspection will monitor depth of soil saturation, water depths, plant community density (percent cover), composition and community structure along established transect(s). The monitoring procedure will follow the Massachusetts DEP wetland documentation sampling procedure as described in their publication *Delineating Bordering Vegetated Wetlands*, March 1995. This procedure is essentially the same as the USACE wetland documentation procedure. Any deficiencies will be noted and appropriate action will be recommended to bring the areas into compliance with the plans and specifications or to ensure success of the restoration and replication efforts. Annual reports will be submitted to the Conservation Commissions after each of the two growing seasons to describe the areas and present recommendations for remedial actions, if needed.

5.8.2 *Phragmites* Removal

Section 2.3.4 of the DEIR discussed a couple of different methods for *Phragmites* removal and control. As described in the DEIR, common reed growing within the channel will be removed during the dredging activities. The *Phragmites* mats will either be removed by mechanical means during the dredging operation, or via the hydraulic dredge. The root mat and attached above ground stalks will be disposed of with the dredged materials.

Phragmites growing along the riverbanks, beyond the limit of dredging, will need to be removed by other means. A combination of herbicide application and mechanical removal of reeds and their roots is proposed. Initial *Phragmites* removal along the riverbank, especially within wetland restoration and replication areas is a two-step process, followed by on-going inspection and maintenance. Initially, it is recommended to cut *Phragmites*, as well as other invasive species such as buckthorn (*Rhamnus cathartica*) and Japanese knotweed (*Polygonum cuspidatum*) during the active growing season and apply a glyphosate-based herbicide (e.g. Rodeo or Roundup) to the cut stalks. This will kill the target plant as well as its roots and rhizomes. Even in areas where the bank will be re-graded, it is recommended to apply herbicides to kill the roots and rhizomes prior to starting earth work. Glyphosate herbicides can be applied by backpack sprayers or applied to individual plants by hand. This is a non-selective herbicide and will kill target as well as non-target species. Therefore care must be used if surrounding plants are to be retained. In areas of dense mono-specific stands of *Phragmites*, spraying is most effective.

After the invasive plants have been cut, treated and roots removed, where applicable, the finish grades will be established consistent with the final grading plans using topsoil as described above. Wetland plants will be installed and the soil stabilized either using ground cover plantings, mulch or erosion control mats. Plantings of trees and shrubs will assist in containing the re-establishment and spread of *Phragmites*, as it requires full sun (Thunhorst, G.A., 1993). Planting of trees along the river can be considered a long-term "BMP" to control *Phragmites*, as evidenced by the lack of *Phragmites* growing under the willow trees in the vicinity of the Boston Fire Department Facility in the Back Bay Fens.

After the Olmsted plantings are completed, routine inspections and maintenance of the plantings will be required to cull out invasive plants including *Phragmites*. Again two procedures are proposed - hand pulling and/or herbicide application. Species such as buckthorn and other undesirable species with discrete and intact root systems can be hand pulled or dug out, as specimens are observed during routine inspections and maintenance activities. The removed plants need to be disposed of in a manner to prevent their spread to other locales. Species that produce viable rhizomes, or that have dense root mats or breakable stalks (e.g. *Phragmites* or purple loosestrife) should be removed via herbicide applications. Where this will occur after the establishment of the desired plantings, it is recommended that individual specimens be treated as they are observed during routine inspections, rather than spraying. Treating individual plants will prevent the accidental application to desirable plants. It is

anticipated that inspections and treatment will be required two to three times in the first two years after the Olmsted plantings are established. Over time, sources of invasive plants from the surrounding area or the soil seed bank are expected to diminish, resulting in reduced occurrences of invasive plant species over time.

5.8.3 River Daylighting

As described above in Section 5.4.1 Back Bay Fens, the Muddy River flow is conveyed in twin 6-foot-diameter culverts in the upper Fens. An important project element involves restoring two sections of culverted flow to open-channel flow, at the former Sears parking lot (between the Riverway and Brookline Avenue) and at the Avenue Louis Pasteur. The primary purpose of restoring these areas to open-channel flow is to remove the flow restriction currently created by the approximately 900-foot-long twin culverts that currently convey flow from the Back Bay Yard to the Avenue Louis Pasteur. Restoring open-channel flow in these two sections of the river aids in the reduction of flooding and thus serves as a long-term flood mitigation measure. The restoration of these sections to open-channel flow provides the opportunity to increase the area of natural resources along the river corridor. Daylighting the river in these two locations will restore approximately 700 linear feet of the river to open-channel flow and allow the replication of approximately:

- 1 acre (43,560 square feet) of Land Under Water
- 1,690 linear feet of Inland Bank, and
- 6,760 square feet of BVW.

Please note, the area of BVW replication in the daylighted areas is approximate based on the preliminary cross section depicted on Figure 5-9. The quantity of wetland resources added to the river as result of daylighting will be refined as the final design plans are developed.

Figures 5-18 and 5-19 (Sheets L-23 and L-22, respectively, from the DEIR) depict the preliminary planting design for the daylighted section at the former Sears parking lot. The wetland and riparian corridor will be planted with a mixture of ground cover, shrubs and trees to establish a diverse plant community both structurally and in species richness. Figure 5-20 (Sheet L-18 from the DEIR) depicts the preliminary planting design for the daylighted area immediately west of the Avenue Louis Pasteur. Replication of BVW in these areas will be completed and monitored as described above in Section 5.7.1. Although the planting plan has not been finalized, the wetland indicator species consistent with the original Olmsted design available for use in these areas are identified in Table 5-7.



LEGEND

PROPOSED SHORELINE LOCATION

EXISTING SHORELINE TO BE RETAINED

EXISTING TREES TO BE RETAINED

PROPOSED TREE PLANTING

PERENNIAL PLANTING

LOW SHRUB PLANTING

MEDIUM SHRUB PLANTING

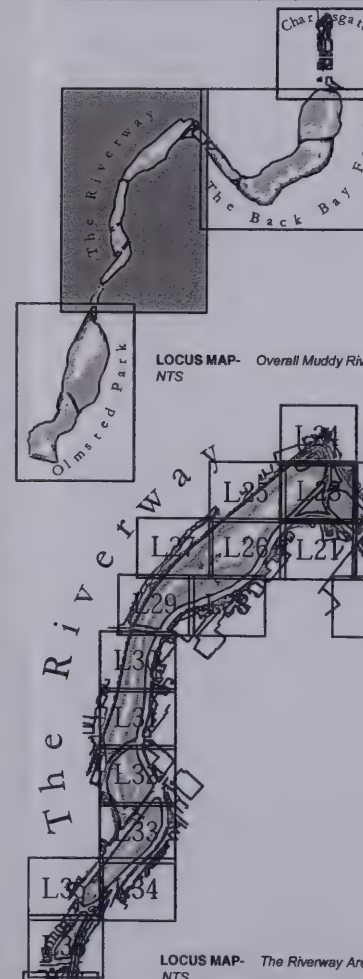
HIGH SHRUB PLANTING

NEW OR REPLACEMENT PATHS

NOTES

1) All disturbed areas remaining after implementation of planting to be loamed and re-seeded (except where noted on drawings).

2) Appropriate wetland species to be planted along length of disturbed banks, to a width of 2'-0" (except where noted on drawings).



Pressley Associates, Inc.
 430 Columbia Street
 Cambridge, MA 02141
 Phone: (617) 491-5300
 FAX: (617) 491-7882
 Email: pressley@pressleyinc.com

The Muddy River Restoration Project

Boston and Brookline, Massachusetts

REVISION	NO.	DATE	REVISION

PRELIMINARY DESIGN

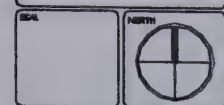
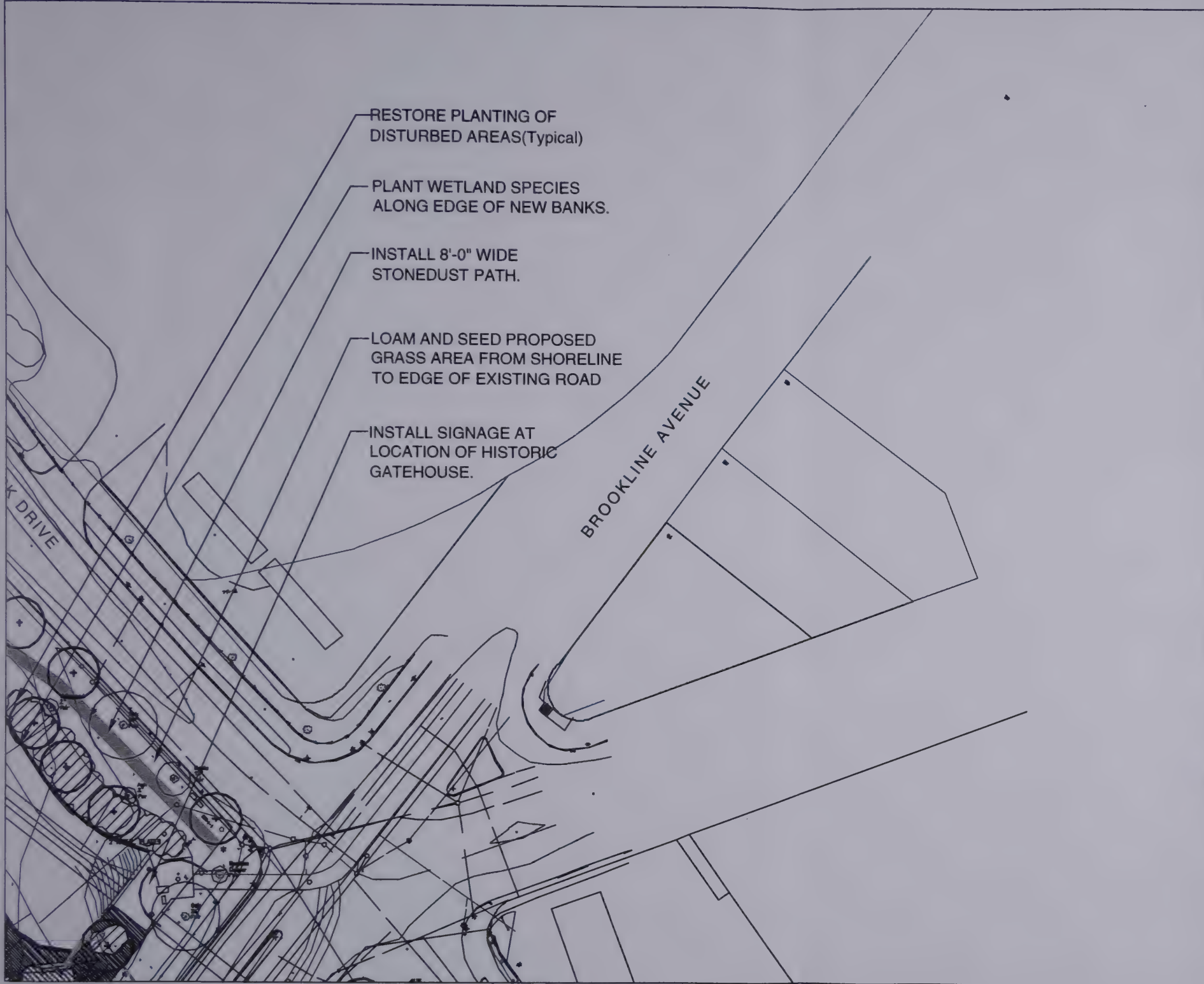


FIGURE 5-18

L23



LEGEND

PROPOSED SHORELINE LOCATION

EXISTING SHORELINE TO BE RETAINED

EXISTING TREES TO BE RETAINED

PROPOSED TREE PLANTING

PERENNIAL PLANTING

LOW SHRUB PLANTING

MEDIUM SHRUB PLANTING

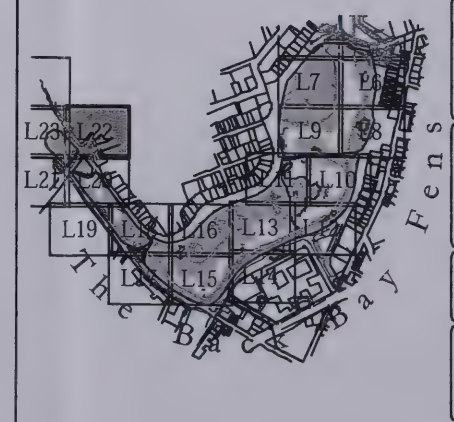
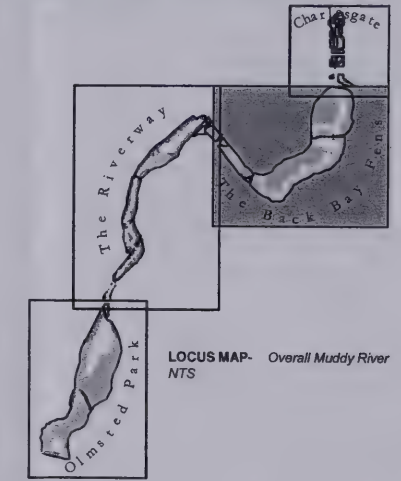
HIGH SHRUB PLANTING

NEW OR REPLACEMENT PATHS

NOTES

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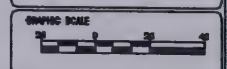
Pressley Associates, Inc.
 122 Columbia Street
 Cambridge, MA 02141
 Phone: (617) 491-5300
 FAX: (617) 481-7502
 Email: pressley@pressleyinc.com

The Muddy River Restoration Project

Boston and Brookline, Massachusetts

REVISION	DATE	REMARKS

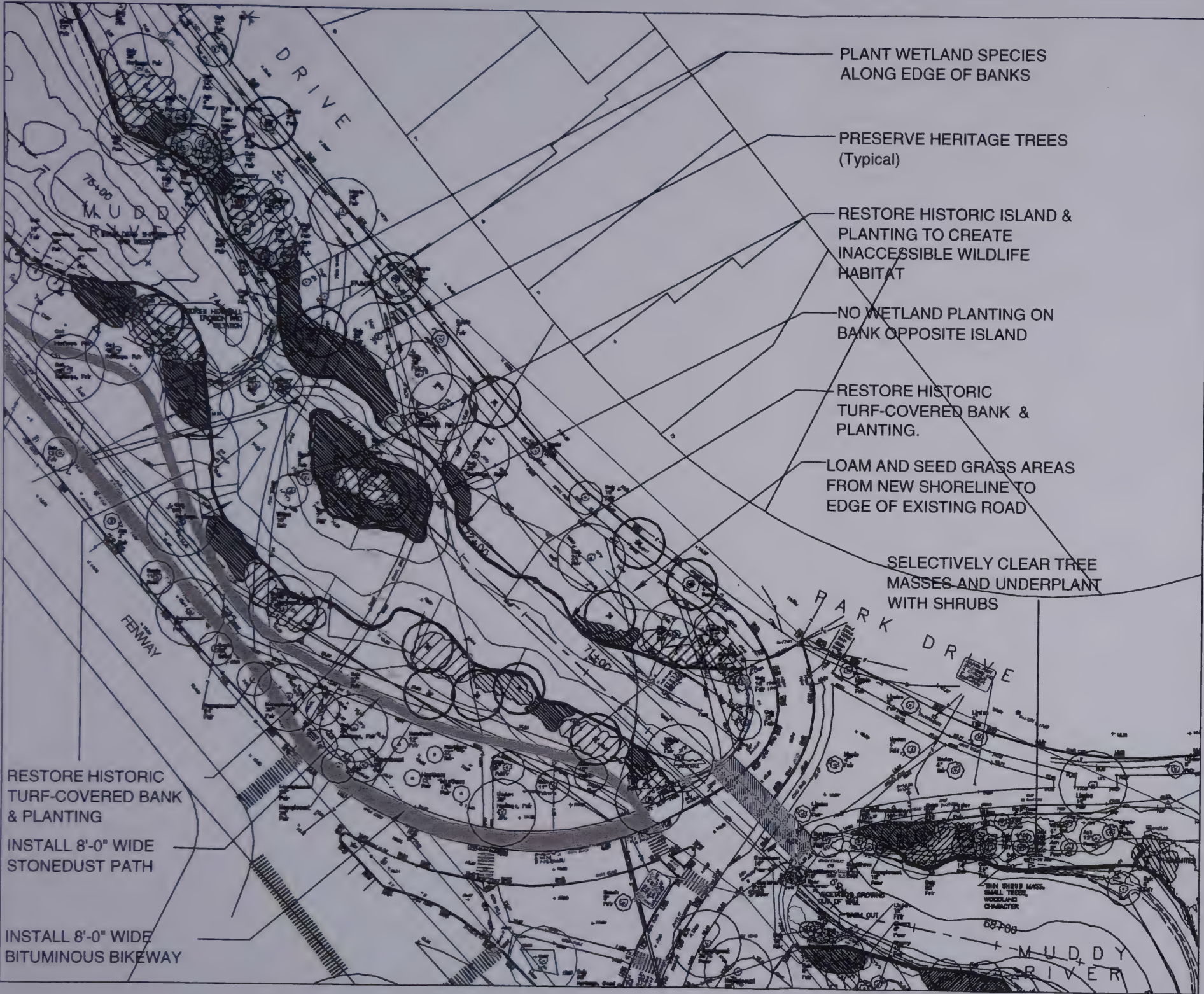
PRELIMINARY DESIGN



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 CHECKED BY: [blank] DATE: 1/1/00
 SCALE: 1"=40'

FIGURE 5-19

L22



LEGEND

PROPOSED SHORELINE LOCATION

EXISTING SHORELINE TO BE RETAINED

EXISTING TREES TO BE RETAINED

PROPOSED TREE PLANTING

PERENNIAL PLANTING

LOW SHRUB PLANTING

MEDIUM SHRUB PLANTING

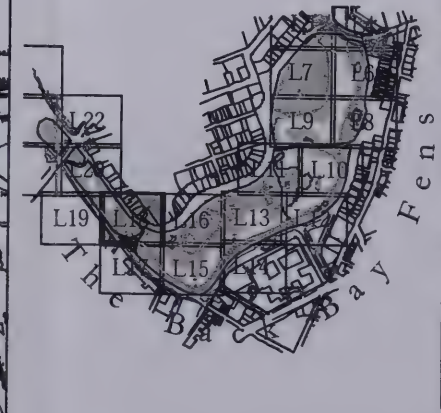
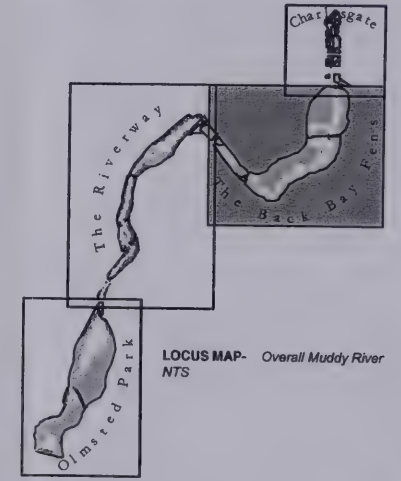
HIGH SHRUB PLANTING

NEW OR REPLACEMENT PATHS

NOTES

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2) Appropriate wetland species to be planted along length of disturbed banks, to a width of 2'-0" (except where noted on drawings).



Pressley Associates, Inc.
 430 Columbus Street
 Cambridge, MA 02141
 Phone: (617) 491-5300
 FAX: (617) 491-7882
 Email: pressley@pressleyinc.com

The Muddy River Restoration Project

Boston and Brookline, Massachusetts

<p>PRELIMINARY DESIGN</p>	<p>GRAPHIC SCALE</p>
<p>DATE: _____</p>	<p>DATE: _____</p>
<p>DESIGNED BY: _____</p>	<p>DESIGNED BY: _____</p>
<p>CHECKED BY: _____</p>	<p>CHECKED BY: _____</p>
<p>DATE: 12/14/00</p>	<p>DATE: 12/14/00</p>
<p>SHEET: 1 of 4</p>	<p>SHEET: 1 of 4</p>

FIGURE 5-20

L18



Section Six

Section 6

Project Permitting

6.1 MEPA Certificate and FEIR Comments

The MEPA Certificate on the FEIR states that the permitting for the project is complex and requires that the SFEIR include a summary of all permits for each subarea of the project, including demonstrating how the project design meets performance standards or variance criteria. The SFEIR should also include documentation of efforts made to consult/coordinate with the permitting agencies.

The Certificate states that the project will require several approvals from the Department of Environmental Protection (DEP):

- Wetlands Protection Act (possible variance);
- Section 401 Water Quality Certificate;
- Chapter 91 Waterways Permit; and
- Special Waste Determination.

Other permit/review requirements, according to the MEPA Certificate, include the following:

- Section 404 permit under the Federal Clean Water Act from the USACE;
- Sewer Use Discharge Permit and Section 8(M) Permit from the Massachusetts Water Resources Authority (MWRA);
- Massachusetts Historical Commission review;
- Boston Landmarks Commission review; and
- Brookline Preservation Commission review.

Note that, since the completion of the FEIR, there have been meetings with various regulatory agencies, resulting in resolution of some permitting issues. For instance, it is presumed that a variance from the Wetlands Protection Act will not be required.

6.2 Summary of Permits for Each Subarea

Table 6-1 and the summary text below address permits by subarea (interpreted to be Back Bay Fens, Riverway, and Ponds) in response to the MEPA Certificate on the FEIR.

The primary difference between permit requirements in the three subareas is related to geographic jurisdiction. As indicated in Table 6-1, it is expected that the same

approvals will be needed for work in the Riverway and the Ponds. Both subareas are located in Boston and Brookline, so appropriate local approvals will be needed from entities in both communities. Back Bay Fens, on the other hand, is located entirely within the City of Boston. Therefore, work in this subarea will not require local approvals from the Town of Brookline.

Note that permits may not be obtained by subarea, but by construction contract. If the USACE assumes responsibility for the project, it may proceed with all infrastructure work first (culverts and daylighting), followed by dredging. Under this scenario, permits for all infrastructure-related activities may be obtained first, followed by permits for dredging, depending on the overall schedule and availability of information for permitting purposes.

6.3 Description of Permits/Approvals

6.3.1 Section 404 Permit

The USACE regulates discharges of dredged and fill material into “waters of the United States” which includes federally regulated wetlands and water bodies. Generally, if less than one acre of a wetland or water body will be affected, and specific conditions are met, a project will qualify for a Programmatic General Permit. For this project, more than one acre of “waters of the United States” will be affected; therefore, an Individual Permit will be necessary (unless the USACE conducts the project). If the USACE conducts the project, no 404 permit would be required (although the USACE has prepared an Environmental Assessment). If conducted by entities other than the USACE, it is anticipated that one permit will be sought for the entire project, rather than by subarea or construction contract.

6.3.2 DCR Construction Permit

Work on Department of Conservation and Recreation (DCR) property will require DCR approval through issuance of a construction permit assuming DCR will follow the same permitting process as its predecessor, MDC. MDC approval will require a submittal of project plans and a description of the proposed work, including mitigation measures.

6.3.3 Order of Conditions

An Order of Conditions under the Massachusetts Wetlands Protection Act is required for alteration of wetland resource areas. It is anticipated that an Order of Conditions will be obtained for each construction contract, although it is likely that the individual Orders will be very similar. In the Back Bay Fens, only the Boston Conservation Commission will be involved. In the Riverway and the Ponds, both Boston and Brookline Conservation Commissions will be requested to review work in jurisdictional areas. As described in Section 5, the project qualifies as a limited project under the Wetlands Protection Act (310 CMR 10.53(4) – Resource Area Improvement). Therefore, even if the amount of wetland disturbance exceeds regulatory thresholds, the appropriate Conservation Commission can issue an Order of Conditions allowing the work to proceed.

**Table 6-1
Anticipated Permits by Project Subarea**

Permit/Approval	Agency/Authority	Subarea Applicability		
		Back Bay Fens	Riverway	Ponds
Federal:				
Section 404 Permit	U.S. Army Corps of Engineers	X	X	X
State:				
Construction Permit	MA Dept. of Conservation and Recreation	P	P	P
Order of Conditions	Boston Conservation Commission	X	X	X
Order of Conditions	Brookline Conservation Commission		X	X
401 Water Quality Certificate	MA Dept. of Environmental Protection	X	X	X
Chapter 91 Waterways Permit	MA Dept. of Environmental Protection	X	X	X
Special Waste Determination	MA Dept. of Environmental Protection	P	P	P
Historic/Archaeological Review	MA Historical Commission	X	X	X
Other:				
8(M) Permit	MA Water Resources Authority	P	P	P
Certificate of Appropriateness	Boston Landmarks Commission	X	X	X
Historic/Archaeological Review	Brookline Preservation Commission		X	X

Legend:

X = Anticipated

P = Potential

6.3.4 401 Water Quality Certificate

A 401 Water Quality Certificate from DEP is required for dredging and for impacts to wetland resource areas exceeding 5,000 sf. It is anticipated that one Water Quality Certificate will be sought for the entire project, covering all three subareas, to mirror the USACE permitting process, as applicable.

6.3.5 Chapter 91 Waterways Permit

As with the USACE permit and 401 Water Quality Certificate, one Chapter 91 Waterways Permit will be obtained for the entire project area. This permit is triggered by the proposed dredging activities.

6.3.6 Special Waste Determination

When dredged material is proposed to be reused or disposed at in-state landfills, it must meet the criteria of the licensed landfill. If the composition or character of the material is such that it does not meet the licensed criteria, the DEP can determine that the material is a special waste provided DEP determines there would be no adverse impacts to reusing or disposing of the wastes at the licensed landfill. A special Waste Determination will have to be obtained from the DEP by the Contractor when they propose reuse or disposal at an in-state landfill that does not cover the criteria of the dredged material. Material disposed out-of-state will not require a Special Waste Determination but will have to meet reuse or disposal criteria for the proposed landfill.

6.3.7 Historic/Archaeological Review

As described in the DEIR and FEIR, one of the five goals of the Phase I Muddy River project is historic preservation given the historical significance of the project area. The Massachusetts Historical Commission (MHC), Boston Landmarks Commission, and Brookline Preservation Commission will be provided with more detailed information and plans showing the historical treatment of new and rehabilitated structures as that information is developed. Consultation with these parties will continue throughout the design process.

6.3.8 Massachusetts Water Resources Authority (MWRA) Approval

MWRA issues an 8(M) Permit for any work that may potentially affect an MWRA utility line. One or more applications for an 8(m) permit will be submitted to MWRA, as appropriate, for any construction activities that are in close proximity to MWRA water or sewer lines.

The MEPA Certificate on the FEIR states that a Sewer Use Discharge Permit will also be required from MWRA. At this time, there are no planned discharges to an MWRA sewer, during or after construction. Therefore, this approval would not be required.

6.4 Compliance with Performance Standards

The project will comply with all applicable regulatory performance standards. A discussion of the project's compliance with the Wetlands Protection Act performance standards for a limited project is provided in Section 5 of this SFEIR. Table 14-1 in Section 14 lists performance standards that will be met and mitigation measures that will be implemented to ensure compliance. The primary means of reporting or recording compliance with the applicable performance standard are also noted in Table 14-1.

6.5 Coordination with Permitting Agencies and Other Groups

The Muddy River project has involved, and will continue to involve, a number of stakeholders, including, federal and state regulatory agencies such as MEPA, USACE, DEP, MBTA, and MHD; and local authorities from both Boston and Brookline. The relationships between the various entities are described in Section 9 of this SFEIR and are depicted on Figure 8-1 (in Section 8).

The City of Boston and Town of Brookline have met with DEP and other regulatory agencies several times between preparation of the FEIR and SFEIR and have provided agency representatives with draft copies of select SFEIR sections for review prior to finalization. The result of these discussions is resolution of some of the issues raised in the MEPA Certificate and comment letters on the FEIR.



Section Seven

Section 7

Stormwater Management/Pollution Control

7.1 Introduction

The purpose of this section is to provide a more detailed approach for the stormwater best management practice (BMP) plan for the Muddy River watershed. This section is intended to supplement the information presented in the Draft and Final Environmental Impact Reports (DEIR and FEIR). Issues related to BMPs discussed in the previous reports will be repeated, where appropriate, to help clarify the review process conducted for this project and to summarize the BMP plan. Additionally, there is new information presented in this section that is intended to replace outdated information in previous documents.

The BMP plan has evolved from a general outline to a more detailed and committed action plan. The proponents of this project stand committed to each of the BMP items discussed to increase the life of the proposed Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project. This BMP plan is one of the five overall project objectives addressing flood control, water quality, enhancing aquatic and riparian habitat, restoring landscape and historic resources and instituting Best Management Practices. The individual objectives of this BMP plan are:

- Minimize re-sedimentation rates;
- Contribute to an improvement of the water quality to Class B Water Quality Standards;
- Maintain project improvements;
- Contribute to fishing and recreational uses in the Muddy River; and
- Contribute to fishing/swimming goal for the Charles River.

BMPs can be categorized as either structural or non-structural. Structural BMPs treat urban runoff rather than prevent it at its source and are also known as “treatment control” BMPs. In addition to operational practices, non-structural BMPs can prevent or limit sediment and other contaminants in urban runoff, thereby controlling it at the source and decreasing the need for some treatment control measures. Non-structural BMPs, such as educational measures and legislation, are key components of an effective BMP plan.

The goal of the BMP plan for the watershed is to decrease the estimated Year 2000 sediment loadings in the river by 30 percent. This reduction will expand the life of the dredging project from in excess of 25 years to over 50 years. This goal can be achieved by implementing a BMP plan that includes improvements to both source and treatment control BMPs. The basis of the improved plan is a basin-wide evaluation of potential structural and non-structural BMPs and is discussed in detail in Section 7.3. Attaining this goal will also allow the watershed to improve the water quality, maintain project improvements, and increase the recreational uses of the Muddy and Charles Rivers.

This BMP plan is only the beginning of the process that aims to improve conditions in and around the Muddy River. After the proposed BMPs are in place, water quality parameters will be measured and performance will be documented. The annual report will summarize the activity in the watershed and it will provide guidance for future improvements. The BMP plan will be revisited to ensure that the goals are being met.

This section is organized into four major subsections.

- Section 7.2: MEPA Certificate and FEIR Comments
- Section 7.3: Existing Sediment Loading and Proposed Goal
- Section 7.4: Summary of Existing BMPs and the BMP Plan
- Section 7.5: BMP Plan Costs
- Section 7.6: Stormwater Management and Maintenance Plan

7.2 MEPA Certificate and FEIR Comments

The MEPA Certificate on the FEIR required that the SFEIR present additional information regarding stormwater management and pollution control in order to:

- Justify the reductions in sedimentation rates and improvements in water quality from the proposed stormwater and pollution control BMPs,
- Evaluate the potential for increased compliance with the standards for TSS removal contained in the DEP Stormwater Management Guidelines,
- Determine the feasibility of targeting the largest nonpoint sediment sources from the largest drainage catchments area for TSS removal and other treatments, and
- Provide any results available from the BMP Pilot Program.

Requests for similar information were received during the public comment period from several non-governmental organizations including the Charles River Watershed Association and the Emerald Necklace Citizens Advisory Committee as well as the Massachusetts Historical Commission and the Massachusetts Department of Environmental Management (now part of DCR).

7.3 Existing Sediment Loading and Proposed Goal

To establish a sediment reduction goal, the existing sediment load from the Muddy River watershed was first evaluated. The Watershed Management Model (WMM) developed by CDM (Rouge River National Wet Weather Demonstration Project, Technical Memorandum, User's Manual, RPO-NPS-TM27.01) was used to approximate the watershed-based sediment load. This sediment load estimate was used for some BMP sediment load calculations.

7.3.1 Sources of Sediment

The sources of sediments, as researched in sources by the USACE, USEPA and MADEP were presented in the DEIR as Figure 2-40. The sources of sediment, as referenced by the USACE, USEPA and MADEP were presented in the DEIR as Figure 2-40. The majority of sediment load to the Muddy River results from the following sediment sources:

- Eroding banks and uplands;
- Decayed leaves and brush;
- Street sanding;
- Construction sites; and
- Typical urban runoff-litter and animal waste.

To acquire more detailed, site-specific data would require many years of sampling and analysis. Analyzing this distribution has resulted in a BMP program focused on removing sediment from street sources, which will be one of the most effective strategies. Street sweeping, catch basin cleaning and structural BMPs within the storm drain system (particle separators) all serve a role in limiting the amount of sediment that reaches the river from street sources. Additionally, revitalization and maintenance of the Muddy River banks and parks will also help to minimize erosion into the river.

7.3.2 Sediment Loadings

Existing sediment loadings in the Muddy River watershed were estimated to evaluate control strategies that will be the most effective in reducing the sediment load. Sediment loadings are defined as the amount of material that runs off the watershed during rainfall events and accumulates in the river. The basic methodology uses a Watershed Management Model (WMM) to calculate sediment loads based on land use types in the watershed since there are insufficient site specific data to measure actual sediment loadings.

7.3.2.1 Watershed Management Model (WMM)

The WMM was developed by CDM and calculates pollutant loads within a watershed on an annual or seasonal basis. The WMM model has been used in Georgia, Michigan, Missouri, North Carolina, South Carolina, Tennessee, and extensively in Colorado and Florida. This model is used for the total maximum daily load (TMDL) studies, watershed studies, watershed management planning, stormwater master planning, National Pollutant Discharge Elimination System (NPDES) permit applications, and the significant Rouge River Wet Weather Demonstration project in Michigan.

The WMM model uses simple methodology to calculate watershed-based loadings in comparison with models such as the Stormwater Management Model (SWMM) and Hydrologic Simulation Program Fortran (HSPF) that calculate loadings and route through various discharge points. The WMM model was selected due to its ability to provide a rapid means of calculating watershed loads with minimal data requirements. This type of

model is typically used to guide management plans and to assist in narrowing focus for continuing monitoring efforts.

Based on the limited data available, the watershed load computations performed in the WMM model would result in approximately the same output as those calculated by a more complex model (such as SWMM or HSPF).

User defined entry data in the WMM include stormwater event mean concentrations (EMCs), land use, average annual precipitation, annual and average base-flow concentrations, point source flows, and pollutant concentrations. The model estimates annual stormwater runoff pollution loads and concentrations based on EMCs, land use, percent impervious, and annual rainfall. The WMM also estimates stormwater runoff pollution load reduction due to partial or full-scale implementation of onsite or regional BMPs, including both structural and non-structural controls.

The EMC is a flow-weighted, average total suspended solids (TSS) concentration for a storm event and is defined as the sum of individual measurements of storm water pollution loads divided by the storm runoff volume (EPA, Rouge River Reference). The EMC is widely used as the primary statistic for evaluations of stormwater quality data and is the stormwater pollutant-loading factor in analyses of pollutant loadings to receiving waters. Runoff volumes are computed for each land use category based on the percent impervious of the land use and the annual rainfall. The runoff volumes are multiplied by land use specific mean TSS EMC load factors (mg/L) to obtain non-point pollutant loads for each land use category. Table 7-1 presents the EMCs and percent impervious factors used for the Muddy River watershed.

The EMCs used in this analysis were based on the WMM's default pollutant concentrations since local data were not available. EMCs for all land uses, except major highways, are based on the pooled USEPA National Urban Runoff Program (NURP) study median EMC statistics (EPA, 1983b) and EMC data reported by the Northern Virginia Planning District Commission (NVPDC 1979, 1983b). Highway runoff data reported by the Federal Highway Administration (FHWA, 1990) are applied to major highways. (Rouge River National Wet Weather Demonstration Project, WMM Users Manual).

Based on comments on the FEIR received from DEP, the EMCs used to calculate sediment loads were re-evaluated. Previously, the default NURP EMCs were modified using the upper end of the range of values to reflect estimated site conditions within the watershed and anecdotal data on historic sediment loading. The EMCs also were increased to effectively represent an additional component of sediment load to the Muddy River, in the form of organic loading. For the SFEIR, the EMCs were re-evaluated after discussions with DEP who were uncomfortable with the adjustments made to the EMCs. The discussions resulted in an agreement to use the mean NURP EMC value for each land use was used in the WMM in preparing this SFEIR and adding the allowance for the organic load in the river. The organic component of the watershed load is discussed further in Section 7.3.2.2.

Table 7-1
Mean TSS EMC Values and Percent Impervious for Muddy River Land Use

Land Use Type, L ⁽¹⁾	TSS EMC (mg/L) ⁽²⁾	Percent Impervious, IMP _L ⁽³⁾	Area, A _L (acres)
Agriculture/Pasture ⁽³⁾	216	0.5	221
Commercial ⁽⁴⁾	91	80	128
Forest/Rural Open ⁽³⁾	216	0.5	114
High Density Residential ⁽⁴⁾	140	65	366
Medium Density Residential ⁽⁴⁾	140	38	443
Medium Density Residential/Institutional ⁽⁵⁾	140	38	378
Low Density Residential ⁽⁴⁾	140	20	1,142
Industrial ⁽⁴⁾	91	72	0.4
Highway ⁽³⁾	142	90	0
Office/Light Industrial ⁽⁵⁾	91	65	28
Parking Lot ⁽⁶⁾	142	95	15
Transportation ⁽³⁾	142	80	474
Private Road ⁽⁵⁾	140	85	16
Urban Open ⁽³⁾	216	0.5	266
Water ⁽³⁾	26	100	173

- 1) Land use types reflect GIS data obtained from the Town of Brookline and the Massachusetts Geographical Information System (MassGIS) in 2002. Terminology of the land use types may have been modified slightly to reflect land use categories as default inputs in the WMM model.
- 2) TSS EMC values are based on the USEPA report: Results of the Nationwide Urban Runoff Program: Volume I – Final Report (1983).
- 3) Percent impervious is the default value assigned to the land use category in the WMM model.
- 4) The percent impervious values are based on values in the United States Agricultural Department (USDA) National Resource Conservation Service (NRCS) Urban Hydrology for small watersheds - Technical Release 55 (TR-55).
- 5) The medium density residential/institutional percent impervious value is the same as the default WMM medium density residential value, the office/light industrial value is based on the default WMM industrial value, and the private road land use percent impervious value is an average of the default WMM transportation and highway values.

Additional EMC data were presented in a recent USGS study, *Streamflow, Water Quality, and Contaminant Loads in the Lower Charles River Watershed, Massachusetts, 1999-2000* (Breault et al, 2002). The following paragraphs address the applicability of the data collected from the USGS gauge in the Muddy River (01104683) for purposes of estimating watershed-based sediment loads to the Muddy River.

While the primary method of data collection was relevant to the USGS study (which focused on loads to the Charles River), the USGS monitoring station in the Muddy River site does not result in TSS data appropriate for the current analysis. The USGS monitoring station for the Muddy River was located in-stream. In order to collect data representative of the loadings from various storm drains, flow and water quality data must be collected at storm drain outfalls at various locations in the Muddy River watershed. Though relevant for purposes of the USGS analyses, EMC data as well as annual loads calculated from EMCs for the Muddy River at the USGS gauging station do not provide an

additional level of data necessary to refine the present sediment loading estimates calculated using the WMM.

The water quality and contaminant load data monitored and evaluated by the USGS provide information on contaminant concentrations in-stream; therefore, contaminant loads calculated using flow-weighted EMCs are much lower than would be expected if a similar level of effort were used to collect data at storm drain outfalls tributary to the Muddy River (i.e. Village Brook drain, Tannery Brook drain, Chestnut Street drain). This is due to the fact that the majority of the TSS has deposited at various points in the Muddy River upstream of the USGS monitoring station. Therefore, while the USGS monitoring site in the Muddy River provides water quality and load data in terms of what is being carried into the lower Charles River; the data are not representative of a watershed-based load for the Muddy River.

To convert TSS EMCs to annual TSS or sediment loads, non-point pollution loading factors are used. WMM non-point pollution loading factors vary by land use and percent impervious of each land use. For each land use, M_L , the pollution loading factor in pounds per year is calculated using Equation 7-1:

$$M_L = EMC_L * R_L * K \quad \text{Equation 7-1}$$

M_L is the loading factor for land use L in pounds per year, EMC_L is the event mean concentration of runoff from land use L in milligrams per liter, and R_L is the total average annual surface runoff from land use L in inches per year. The unit conversion constant, K, is equal to 0.2266 ((6272640 in²/ac) * (0.0164 L/in³) * (0.00000221 lb/mg)). R_L is computed using Equation 7-2:

$$R_L = [C_P + (C_I - C_P) * IMP_L] * I \quad \text{Equation 7-2}$$

R_L is the total average annual surface runoff from land use L in inches per year, IMP_L is the fractional imperviousness of land use L from Table 7-1, I is the long-term average annual precipitation in inches per year, C_P is the pervious area runoff coefficient, 0.20, and C_I is the impervious area runoff coefficient, 0.95. For the Boston area, the long-term average annual precipitation is 41 inches per year (NOAA, 2000).

7.3.2.2 Existing and Proposed Sediment Loadings

Sediment loading into the Muddy River has followed a decreasing trend based on historical values. This decreasing trend is mostly due to capital improvement to the stormwater conveyance system within the watershed and the increase in BMPs within the watershed. However, sediment loading is still high enough to cause re-sedimentation in the Muddy River in excess of 25 years. The goal of the BMP plan for this watershed is to decrease the estimated 2000 sediment loading in the river by 30 percent. A reduction of 30 percent will expand the life of the dredging project from approximately in excess of 25 years to greater than 50 years.

The Year 2000 sediment loading was estimated using Equations 7-1 and 7-2, and by adding a factor of 25 percent for organic material. The organic loading factor includes material that falls into the river from vegetation bordering the river and vegetative growth in the river that dies off. The USACE estimated that the organic load could be over 50 percent in this eutrophic riverine-pond environment as reported in their Draft Feasibility and Environmental Assessment in February 1998. On the basis of TSS EMC data alone, the Year 2000 sediment load of 1,340 cubic yards (cu yd) was calculated. Including an additional 25 percent for the organic component in the TSS load results in the Year 2000 sediment load of 1,675 cu yd. The existing BMPs have decreased sediment loads in the Muddy River from an estimated 4,000 cu yd in 1974 to an estimated 1,675 cu yd in 2000; a 58.2 percent reduction. The estimated sediment load contributions from the major storm drains to the Muddy River are presented in Table 7-2.

Table 7-2
Estimate Annual TSS Loads by Major Drain, Muddy River Watershed

<i>Drain</i>	<i>Annual Load, cu yd</i>
Chestnut Street	39
Daisy Field	16
Longwood Avenue	66
Tannery Brook	119
Village Brook	584
SBC	321
All Other Drains	195
Total	1,340
Total plus 25 percent organic allowance	1,675

Using the same 30 percent reduction proposed in the FEIR, the Year 2000 total sediment load of 1,675 cubic yards will be reduced to an annual load of 1,173 cubic yards per year for Year 2006. The 30 percent reduction in load, or 502 cubic yards, can be achieved by the measures summarized in the following section. Reducing the sediment load to approximately 1,173 cu yd by 2006, equates to a 71 percent reduction since 1974. Considering the urbanization of this watershed, this additional 30 percent reduction of the estimated Year 2000 sediment load presents a challenging, yet achievable condition.

The DEP Stormwater Management Guidelines suggest a TSS removal goal of 80 percent for new projects and to the extent practicable for redevelopment projects. Eighty percent removal is appropriate for new projects and redevelopment projects since the proponent normally controls the entire site of the project. This project addresses an entire urban watershed, rather than just an area of development or re-development and the proponents control very little of the area in the watershed. The 30 percent sediment reduction goal was selected as an achievable goal in the watershed considering the large size of the watershed and limited control by the proponents.

When evaluating the level of BMPs necessary to achieve a 30 percent reduction in solids loading, several considerations must be taken into account to assess the appropriateness of the 30 percent goal. One consideration is whether the TSS goal and overall BMP program are consistent with or greater than the normal TSS rates for storm water management programs. Thirty percent removal for the entire watershed is a fairly aggressive goal for sediment removal given the amount of control that a municipality has over properties in the watershed. The other consideration is whether the expenditure of town and city budgets on BMPs is in proportion to the benefits accrued.

The level of financial resources committed to the BMP program is another measure of the overall suitability of the BMP program in a budget environment of competing priorities. In Brookline, for example, a total of approximately \$5,500,000 was expended on stormwater management over the last eight years and current operating budgets committed to the stormwater activities are approximately \$677,000 per year. If the proposed BMP program described in the SFEIR is implemented, a total of approximately \$3,422,300 will be spent on capital improvements for BMPs alone and the annual operating budget will increase by \$54,380 or 8 percent from the current expenditures. This increased funding represents a clear commitment to the success of the BMP program, especially in current economic times.

The City of Boston portion of the Muddy River BMP program is more difficult to compare to present expenditures since the drainage area represents an extremely small portion of Boston's overall commitment to stormwater management. Many of the components of the stormwater system are managed by several different divisions in Boston. The specific elements of the Boston portion of the program, however, mirror the robust Brookline commitment. Currently, Boston street sweeping practice is to sweep commercial areas once per week and all other areas once per month from April 1 through November 30. Catch basins have typically been cleaned once every three years. In the last several years Boston has cleaned and inventoried all catch basins and completed a monitoring program in selected catch basins to determine the rate of sediment deposition to assess the optimum cleaning frequency. The catch basin cleaning program includes inventory, mapping, and labeling to develop a consistent maintenance schedule. Boston participates in receiving water monitoring, public education activities, and hazardous waste collection events.

In evaluating the proposed program of BMPs, the payback for constructing structural BMPs must be considered. The principal goals of the structural BMP program are to extend the life of the initial investment to dredge the Muddy River and improve water quality. The present worth value to re-dredge the river in 40 years is approximately \$73.27 per cu yd. This present worth value is decreased to \$55.47 per cu yd if the dredging life is extended to 65 years, or a present worth value savings of \$17.80 per cu yd.

7.4 Summary of Existing BMPs and the BMP Plan

There are many existing BMPs in place throughout the watershed. Table 7-3, at the end of this chapter, presents a summary of these BMPs for the City of Boston (BWSC and PWD), the Town of Brookline, and the Division of Conservation and Recreation (DCR).

Current maintenance practices are specifically designed to reduce the amount of sediment, oil and grease, nutrients, metals, and other contaminants that are transported in the storm drain system and discharged to the Muddy River. Brookline currently has an aggressive street sweeping program that includes sweeping commercial streets every night and sweeping the residential streets every seven to ten days. Brookline spent approximately \$421,937 in 2003 on street sweeping. Catch basin cleaning in Brookline is also aggressive. The major roadway catch basins are cleaned twice a year and the side streets catch basins are cleaned once a year. Brookline uses a database linked to the geographical information system (GIS) to track catch basin cleaning and repairs. Approximately \$152,000 was spent on catch basin cleaning in 2003. Although the catch basin cleaning frequency is less than the DEP recommendation of four times per year, the continued use of the data base will allow preventive cleaning of areas that see particularly high sedimentation rates. Storm drain inspection and the illicit and illegal discharge investigation and remediation programs are still implemented by Brookline. The household hazardous products program was maintained by Brookline for \$37,600 in 2003. Since entering into the consent agreement with the EPA in 1995, Brookline has developed and continues to maintain an aggressive Stormwater Management Program. Brookline spent an estimated \$677,000 in 2003 and \$5,500,000 since 1995 on stormwater management improvements.

The DEIR presented background information on BMPs in Section 2 and presented a general recommended plan in Section 5. The recommended source control or non-structural BMPs were: improve street sweeping programs; improve catch basin cleaning programs; develop programs to monitor water quality, planted vegetation, and fish and wildlife to assess effectiveness of the implemented BMPs; correct desire lines; maintain restored banks, pathways and uplands with particular attention to active water-adjacent recreational areas; eliminate mesh trash barrels; develop leaf collection programs; develop a waterfowl control plan; develop a plan to enforce "pooper-scooper" laws; and enhance local stormwater guidelines.

The treatment control alternatives discussed in Section 2.5.3 of the DEIR were constructed wetlands, wet retention ponds, vegetated swales, in-line storm drainage devices, in-stream sedimentation basins, sand filters, and underground vault sand filters. These are all effective BMPs, in proper settings. The development of a pilot study to track the application and retrieval of solids in particle separators was recommended before any further treatment control BMPs are implemented due to the inconsistent effectiveness of existing particle separators. The Charles River Watershed Association (CRWA) concurs with the need to complete the pilot study, thereby assessing their effectiveness before the selection and installation of the particle separators for this project. The proponents will utilize the results of the pilot study and make certain the most effective BMPs are put in place to protect the Muddy River.

The following selected treatment control BMP alternatives were judged suitable in the Muddy River watershed and are targeted to the greatest sources of sediment loads:

- Vegetated treatment swale next to Victory Gardens;

- Particle separators at common low points in DCR system, at Daisy Field, and at the Emmanuel College Drain; and
- Additional treatment control (structural) BMPs.

The FEIR addressed comments from the Secretary of Environmental Affairs and outlined a more detailed BMP plan. Again, the goal of the source and treatment control BMP plan for the watershed is to reduce sediment loading to the Muddy River by 30 percent. The Year 2000 estimate of sediment loading to the Muddy River is 1,675 cu yd per year. A 30 percent reduction decreases the annual loading to 1,175 cu yd and therefore requires that 500 cu yd be removed with improved and new source and treatment control BMPs.

One of the main goals of the Muddy River project is flood control. Decreasing the sediment load to the river maintains the flow capacity of the river and is an extension of the flood control goal that will increase the project life. Additional water quality improvements are beneficial by-products of the sediment control extension. BMPs that have high sediment removal efficiencies typically have similar removal efficiencies for some of the other water contaminants. The EPA published an effectiveness summary for some BMPs in Chapter 4 of the report titled: Guidance Specifying Management Measures for Sources of Non-Point Pollution in Coastal Waters (www.epa.gov/owow/nps/MMGI/Chapter4/ch4-2a.html, Table 4-7). This summary considered total suspended solids (TSS), total phosphorus, total nitrogen, chemical oxygen demand, lead and zinc. Typically, the probable ranges of removal efficiencies are the same for TSS, total nitrogen and total phosphorus. Environmental Design and Planning, Inc. evaluated catch basin performance in the NTIS report titled: Evaluation of Catch Basin Performance for Urban Stormwater Pollution Control. The study evaluated several catch basins during small storm events. The data is limited; however, the average TSS removal was 61 percent. The average total phosphorus removal was 83 percent and the average BOD removal was 42 percent. While the high TSS removal efficiencies stated in these reports are not used in this SFEIR for calculating sediment reductions, there is ample evidence that removal of TSS also removes other pollutants thereby improving water quality.

Table 7-4, at the end of this chapter, presents a summary of the recommended source and treatment control BMPs proposed for the watershed. The BMP plan will continue to be evaluated and additional BMPs will be considered where appropriate and consistent with recommendations in Section 5 of the DEIR. The Annual Report will be the document used to review the BMP plan periodically and review appropriate changes to the BMP plan.

7.4.1 Source Control BMPs

Several source control programs are underway and others have been recommended in the DEIR to reduce sediment loadings from runoff. Further improvements to three of the critical source control measures are recommended – street sweeping, catch basin cleaning, and enhanced construction site controls. However, only the improvements to construction site controls will be counted towards the proposed sediment removal goal. Other proposed source control BMPs are an annual water quality sampling program, public

education program, trail maintenance and desire lines, roadway drainage, waterfowl control program, catch basin labeling, enforcement of “pooper-scooper” laws, and enhanced stormwater regulations. The following sections describe the proposed source control BMPs.

Additionally, discussions have been held with the DEP concerning the application of sand and salt to roadways during winter weather conditions. While it may be possible to meter the amount of sand and salt added, public safety will prevail and a reduction in application may not be feasible. In Brookline there are 14 trucks equipped with metering equipment to apply 200 pounds of salt or sand and salt per lane mile of road. This application rate is less than the 300 pounds per lane mile the Massachusetts Highway operations manual recommends which is consistent with a U.S. Roads Road Management Journal article on Using Salt and Sand for Winter Road Maintenance in Wisconsin. Brookline used approximately 6,100 tons of salt and sand in the 2003 – 2004 winter over 125 miles of roadway or approximately 48.8 tons per mile. This quantity is higher than the average of 32.9 tons per mile for some suburban communities in data provided by CRWA but lower than the highest of 54.1 tons per mile. The urban nature of Brookline may account for the higher amount since the roads are generally wider including parking lanes so the rate per lane mile would be more indicative of the application rate.

The proponents remain committed to the entire suite of source control BMPs. This proposed list of BMPs further establishes a more-comprehensive BMP plan approach.

7.4.1.1 Street Sweeping Program

For the Muddy River watershed all proponents meet, and the majority exceed industry norms for street sweeping frequency, however improvements can be made. Improvements to DCR’s annual street sweeping program are recommended to further decrease the sediment load to the Muddy River.

Table 7-5 presents the existing and recommended street sweeping practices including estimated annual sediment reductions. The Year 2000, and similarly the Year 2003, street sweeping practices in the Muddy River watershed are estimated to control over 200 cu yd of sediment. The enhanced Year 2006 street sweeping practices represent a relatively small increase in sediment control, because current practices are excellent over the majority of the watershed. Credit for the expected reduction is not taken towards the overall 30 percent sediment removal goal.

**Table 7-5
Street Sweeping**

Owner	# of Trucks	Year 2000 Practice	Recommended 2006 Practice	Estimated Annual Sediment Reduction
Boston¹	17 daily, 7 nightly, 1 arterial routes nightly, 7 city sweepers	Commercial areas once per week, all others once per month, Apr. 1 – Nov. 30	Commercial areas twice per week, all others once per week	4.7 cu yd (no credit taken)
Brookline	3 (2 night, 1 day)	Commercial areas every night, remaining areas once per week	No change from 2000	No expected reduction
DCR		Varies by street based on need	Once per week	3 cu yd (no credit taken)
MHD²		Annually in the spring	No change from 2000	No expected reduction
Newton		Once per week	No change from 2000	No expected reduction

1. Actual street sweeping practices vary across the City.
2. MHD refers to Massachusetts Highway Department.

The street sweeping sediment removals were calculated by comparing the existing estimated sediment removals with the new, improved removals. The stormwater policy estimates that good street sweeping practices can remove ten percent of the sediment load available. Since Brookline has an excellent street sweeping program in place, the sediment removal was estimated at 10 percent of the sediment load for the Year 2000 and the Year 2006 conditions. Boston and the DCR can improve street sweeping practices, so the estimated Year 2000 percent removal was increased conservatively to five percent. The sediment load associated with the Stony Brook Conduit (175 cu yd) was not considered available when calculating the street sweeping reductions since most of this load has been eliminated with the improvements presented in Section 7.3.2.

In Brookline, the DPW Highway and Sanitation Division conducts street sweeping operations. Currently, Brookline owns and operates three street sweepers. Street sweeping activities occur primarily during the evening hours and there is no overnight parking in Brookline. Streets within Brookline's main commercial areas are swept every night. These streets include Harvard, Washington, Beacon, and adjacent side streets. Two of the sweepers are dedicated to these areas. Residential areas in north Brookline are swept once a week. Streets in south Brookline are swept every ten days. Street sweepers follow the same routes as the curbside trash collection trucks and these routes have been incorporated into the GIS. The street sweeping program complies with the Consent Agreement between Brookline and the EPA. Figure 7-1 presents a photo of a typical street sweeper.

Figure 7-1
Typical Street Sweeper



The Boston Public Works Department (PWD) sweeps the city streets. The PWD has two programs for street sweeping: Posted Street Cleaning and Non-posted Street Cleaning. All non-posted streets are cleaned once a week or more if necessary. The Posted Sweeping Program is separated between a Night Program and a Daily Program. Sweepers also clean streets before and after special events, such as parades, road races and neighborhood festivals.

Boston's Night Sweeping Program includes all of the major city arterial routes. The Daily Sweeping Program typically operates from April 1 through November 30; however, weather and budget influence the start and end of this program. Each side of a posted street is cleaned once every other week. Parked cars and other access impediments can hinder the street sweeping program. Parking bans posted on streets educate the public and result in removal of vehicles on certain days so sweeping can be thorough. Additional street sweepers may be contracted and city sweepers run more frequently during the fall leaf season.

The Boston PWD has five small vacuum sweepers that are used to sweep small alleys and sidewalks. According to the PWD, the vacuum type sweepers tend to clog easily and are not as efficient during cold weather. The PWD tested a large vacuum type sweeper several years ago. The sweeper clogged with larger pieces of litter and would freeze during colder weather. Based on the field testing, the PWD determined that the use of vacuum sweepers is not cost effective. Rotary brush sweepers are currently used by the proponents.

7.4.1.2 Catch Basin Cleaning and Tracking Programs

Currently, the Boston catch basins are typically cleaned every three years, Brookline's catch basins are cleaned once or twice per year, and DCR's goal is to clean all their catch basins once a year. Although the catch basin cleaning programs do not meet the states Stormwater Management Policy frequency, the intent is to move toward a program of cleaning based on documented need. Improvements to the catch basin cleaning program are recommended to further decrease the sediment load to the Muddy River. Table 7-6 presents the existing and recommended catch basin cleaning practices including

estimated annual sediment reductions. The table shows the change from Year 2000 to Year 2006 practices for Boston, MHD, and DCR controlled catch basins. Credit for the expected reduction is not taken towards the overall 30 percent sediment load reduction goal considering the difference in expected removal rates from different sources of information.

The sediment load reduction expected from increased catch basin cleaning was evaluated using a sediment accumulation rate and a sliding scale for sediment capture. The estimated sediment accumulation rate was based on preliminary information from the BWSC Citywide Catch Basin Preventive Maintenance project. The catch basin accumulation rate varies from basin to basin, and depends on weather conditions (snow, ice, etc.). For catch basins with full sumps, additional sediment can not be trapped and will enter the storm drain system. For catch basins that are cleaned frequently (with minimal sediment in the sumps) only a relatively small portion of the sediment load will be discharged to the storm drain system. Sediment captured in catch basins was estimated to range from zero percent for full sumps with no cleaning to 80 percent for catch basins that are maintained less than half full. The estimated annual sediment reductions in Table 7-6 also assume that catch basin cleaning will not be perfect, the values presented are 80 percent of the reductions calculated with the sliding scale.

Table 7-6
Catch Basin Cleaning

Owner	Catch Basins⁽¹⁾	Year 2000 Practice	Recommended 2006 Practice	Estimated Annual Sediment Reduction
Boston ⁽²⁾	161	Varies by location, typically once every three years	Inspect every 2-3 years and clean as needed	30 cu yd (no credit taken)
Brookline	2,350	Varies by location, typically once or twice a year	No change from 2000	No expected reduction
DCR	90 (est.)	Varies by location, goal of once per year	Once per year all locations	35 cu yd (no credit taken)
MHD ⁽³⁾	83 (est.)	Once every two years	Once per year	6 cu yd (no credit taken)
Newton	224	Varies by location, typically once or twice a year	No change from 2000	No expected reduction

1. Number of catch basins in the Muddy River watershed.
2. The DEIR detailed BWSC's existing Catch Basin Identification, Inspection, and Cleaning program. Phase III of this program is developing a catch basin preventive maintenance plan that measures sediment accumulation rates and considers factors such as land use, slope, and street sweeping. Therefore, the catch basin cleaning frequency contained herein may be modified based on the results of the program.
3. MHD refers to Massachusetts Highway Department. All MHD catch basins in the Muddy River watershed are located along Route 9 in Brookline.

In September 2000, BWSC began a three-year program to develop and implement a citywide catch basin inspection, cleaning and preventive maintenance program. Pertinent data, including catch basin location, sediment volume and depth, and structural condition

were tabulated in an electronic database transferable to the GIS. The database will be used to assess whether additional cleanings are required in certain areas. All of the catch basins, including the catch basins in the Muddy River watershed, were cleaned by November 2003. BWSC is currently developing a comprehensive citywide catch basin preventive maintenance plan.

Current practices for catch basin cleaning in Brookline include inspection and cleaning of major roadway basins twice per year and side street basins once per year. During inspection and cleaning, information regarding condition of the structure and amount of material removed are recorded. This information is transferred to a database to track the amount of material recovered and areas cleaned. The database is also used to assess whether additional cleanings are required in certain areas around Brookline. Catch basins have been incorporated into the GIS to serve as a tool to locate and plan cleaning events. The Town of Brookline Stormwater Management Summary – 2003 (in Appendix C) further details the catch basin cleaning practices and includes a GIS map. It is expected that Brookline will use data in the GIS to create a customized catch basin cleaning schedule based on trends in sediment removed. It is recommended that the DCR institute a similar cleaning program using a database to track cleanings and buildup.

7.4.1.3 Construction Site Controls

Uncontrolled construction sites are extreme stressors on the environment. Sediment loads from construction sites are 1,000 to 2,000 times greater than from natural green spaces. Therefore, construction site controls are essential for mitigating construction impact on river sediment loadings.

Under Phase I of the EPA's Stormwater Management Program, effective prior to 2000, only construction sites disturbing more than five acres were required to develop stormwater management plans. Phase II, which became effective in March 2003, reduces the threshold to one acre. The owner and/or operator must apply for this permit for point source discharges of stormwater to any water of the United States. This permit is administered by the EPA and DEP implementing both Phase I and Phase II of the NPDES Program under the authority of the Clean Water Act. Since the Muddy River is located in a highly developed urban landscape, reduction of the threshold in the Phase II plan will dramatically increase the number of construction areas subject to the regulations, resulting in a decrease in sediment loading from construction sites.

In order to prevent oil, grease and sediments from discharging to open waterways, BWSC requires that developers install particle separators on all newly constructed storm drains that serve outdoor paved areas of 7,500 square feet or greater. BWSC may require particle separators on existing storm drains exiting outdoor parking areas, where appropriate. BWSC requires a Drainage Discharge Permit for all non-stormwater discharges to its drainage system, including construction site dewatering, permanent subsurface drainage, non-contact cooling water, non-contact industrial process water, and water associated with hydrological testing, groundwater treatment or remediation, and removal and installation of an underground storage tank. BWSC may deny or condition a dewatering permit to prevent contaminated drainage from entering the drainage system. Under

BWSC's Site Plan Requirements and Sewer Use Regulations, developers of new projects are required to evaluate the feasibility of retaining stormwater on-site. Retaining stormwater on-site is required whenever site conditions permit as determined by the BWSC. On-site retention aids in controlling the rate, volume, and quality of stormwater discharged to the drainage system. Typically, on-site infiltration is accomplished with dry wells although other methods may be used. Developers are required to comply with the DEP Stormwater Standards to the fullest extent possible. Under the Sewer Use Regulations, anyone seeking to construct, repair, or modify a sewer or storm drain service connection to the system, or to discharge under a Drainage Discharge Permit, may be required to prepare and implement an Erosion and Sediment Control (ESC) Plan. The ESC plan will help to prevent the introduction of sediments into sewers and storm drains.

A new Construction Site Runoff Control by-law was passed at the Brookline Town Meeting in Spring 2003. This by-law includes a public "hotline" for reporting non-compliant activities. It also requires construction sites greater than 0.057 acres (2,500 square feet) or sites that store more than 75 cu yd of excavate or fill material to establish an ESC plan. The DPW will conduct ESC plan inspections. A Post Construction Runoff Control by-law was also passed at the Spring 2003 Town Meeting. This by-law requires review of new projects to ensure that all designs incorporate sensible stormwater management practices, operation and maintenance plans for all stormwater structures and practices and site inspections to ensure construction is in accordance with the approved plans.

Brookline reports that approximately 7,000 building permits are issued per year and about 500 require review. If each permit represents 0.25 acres, the estimated total area under review is 125 acres. The EPA reports that the construction site runoff suspended solids (sediment) concentration varies from 359 to 17,500 mg/L, with a mean of 3,681 mg/L. Conservatively using a sediment concentration of 950 mg/L (25% of the mean) for the estimated disturbed area of 125 acres, results in an annual sediment load of 145 cu yd. This annual sediment load is approximately 8.9 percent of the total sediment load for the Muddy River watershed, and is in-line with the previous referenced estimate of 10 percent of the total sediment load. Existing practices are estimated to control 10 percent of the estimated construction site sediment load (14.5 cu yd). Improving practices to control an additional 70 percent of the sediment load from these construction sites results in the Year 2006 sediment load reduction of 100 cu yd.

Brookline and BWSC control the overwhelming majority of land in the Muddy River watershed. Their on-site stormwater controls and retention will have significant effects on sediment loading to the Muddy River. Year 2000 construction site sediment loads are estimated to be 145 cubic yards per year. With these new, strict controls in place, the sediment loading from construction sites is conservatively estimated to decrease to 100 cu yd per year, or 20 percent of the 500 cu yd goal.

7.4.1.4 Annual Water Quality Sampling Program

An annual water quality sampling program will be implemented throughout the watershed. The program will commence before the BMP plan improvements are added

and it will continue through the life of the project (seven to eight years). This program will not directly reduce sediment loads to the Muddy River, but over time it will help quantify sediment load reductions by the other BMPs in the watershed.

Baseline water quality samples will be taken after the SFEIR is approved by the Massachusetts Environmental Protection Agency (MEPA). Water quality sampling will occur on a quarterly basis to measure the effectiveness of the BMP program. Table 7-7 presents the proposed sampling locations in the watershed, eight river locations and seven outfalls. These locations provide representative samples throughout the Muddy River. The water quality sampling program will also be reviewed in the Annual Report and consideration given to changes in the program if necessary. If for example, the data from certain sampling locations is not providing useful data or data that can be obtained from other sources, then consideration will be given to moving sampling locations where more useful data can be obtained.

Table 7-7
Proposed Water Quality Sampling Locations

<i>Within the Muddy River</i>	<i>River Segment</i>	<i>Drainage Outfalls</i>	<i>River Segment</i>
Commonwealth Avenue	Charlesgate	Emmanuel College Drain	Back Bay Fens
Agassiz Road	Back Bay Fens	Longwood Avenue Drain	Riverway
Boston Gate Houses	Back Bay Fens	Tannery Brook Drain	Riverway
Fens Bridge	Back Bay Fens	Huntington Avenue	Olmsted Park
Longwood Avenue Bridge	Riverway	Village Brook Drain	Olmsted Park
Outlet of Leverett Pond	Olmsted Park	Daisy Field Drain	Olmsted Park
Outlet of Willow Pond	Olmsted Park	Chestnut Street Drain	Olmsted Park
Outlet of Ward's Pond	Olmsted Park		

Figure 7-2 presents the sub-basins within the Muddy River watershed. Brookline and BWSC are independently conducting investigations into conditions within the above drainage outfalls to determine potential sources of sewage from illicit connections. During each quarter, water quality samples will be collected during a dry period (no rainfall in past 96 hours), during a precipitation event, and the day following a precipitation event. The rationale behind this sampling frequency is to obtain seasonal data preceding precipitation (rain or snow), and to monitor the impact on water quality parameters during and after an event. Up to 12 sampling events will occur at each sampling location every year. Field monitoring of pH, temperature and dissolved oxygen concentration will be conducted during each sampling event.



0 1 2 3 4 Miles



CDMI

Figure 7-2
Muddy River Watershed Sub-basins

Table 7-8 presents the parameters that will be analyzed by a qualified laboratory.

Table 7-8
Proposed Water Quality Sampling Parameters

Fecal Coliform Bacteria	Turbidity
Fecal Streptococcus Coliform Bacteria	Alkalinity
Total Suspended Solids (TSS or sediment)	Ammonia Nitrogen
True and Apparent Color	Nitrate-Nitrite Nitrogen
Total Phosphorus	Metals
Ortho-Phosphate	TPH-EPH

These parameters mirror typical water quality sampling standards. Data from this sampling program will be used to monitor the water quality as related to meeting DEP Class B waters. The results of the program will also be used to compare to the recommended goal for sediment loading for achieving the re-sedimentation target. The responsibility of the water quality sampling program will be divided among the project proponents, according to watershed area.

7.4.1.5 Public Education Program

A public education program will be developed jointly by the project proponents. The public education program is proposed to educate the public on their role in litter control, cleaning up after pets, and limiting the use of pesticides and herbicides. The program will be evaluated biannually for its effectiveness, and changes will be made accordingly.

There are five measures specified to meet the public education component. Informational brochures will be distributed with utility bills. Information will be placed on Brookline's web page as well as on the Brookline Access Television channel. An "info-line" will be created for general stormwater information. Additionally, posters and videos will be created to target children in grades 8 through 12.

7.4.1.6 Trail Maintenance and Desire Lines

Proper maintenance to address desire lines (unplanned paths) and to prevent erosion and re-sedimentation is another basin-wide source control BMP. The Boston Parks and Recreation Department and the Brookline Parks and Open Space can address desire lines either by formalizing pathways (applying a surface treatment such as stone dust, mulch or pavement material) or by re-vegetating with turf or appropriate plant materials. Consideration will also be given to areas that will be disturbed by construction due to the Muddy River Restoration Project. The desire lines will be addressed annually over several years. Each year, the inventory of eroded or denuded areas that need surface treatment will be updated.

7.4.1.7 Roadway Drainage

The reconstruction, monitoring, and maintenance of the stormwater drainage system along the DCR roadways in the Fens, such as Park Drive, the Fenway, and Agassiz Road

is necessary. Roadway drainage overflows the curb causing erosion along the banks and sedimentation of the eroded material in the Muddy River.

Roadway drainage in the Riverway area from the DCR parkways overflows the curb and erodes the slope in the parklands, resulting in sedimentation in the river. The drainage problems have several causes including undersized and/or clogged drainage systems, poor soils and/or cracked and leaking pipes leading to irregular settling of pavement and curbing, and the splashing of rain runoff in the roadway gutter by passing cars. Repairs will be made by correcting curb foundation problems and repairing or replacing catch basins and storm drains with subsequent pavement repairs. Each failed location will be examined to determine the proper repair technique.

7.4.1.8 Waterfowl Control Program

A good waterfowl control program is a combination of public education (i.e. signs warning pedestrians not to feed the geese) and regulatory actions. The program will be evaluated biannually for its effectiveness.

Brookline has been working with the Massachusetts Society for the Prevention of Cruelty to Animals (MSPCA) Living with Wildlife program to develop a comprehensive approach to goose management. The MSPCA and Geese Peace, a national nonprofit organization, has provided egg-oiling training and public education techniques to several Brookline Parks and Open Space employees. In Spring of 2003 these employees completed the first round of egg oiling along the Muddy River. The reduction in gosling production was evident and plans are under way to further involve volunteers in similar efforts in the Spring of 2004. Goose control fencing and educational signage has been installed in Olmsted Park and this effort will be further expanded into the remainder of the Muddy River watershed. In addition, Brookline's Park Rangers work with park users to educate them on the need to control the geese population through egg-oiling, and why feeding geese exacerbates the problem.

Likewise, Boston has also been working with the MSPCA Living with Wildlife program to develop a comprehensive approach to goose management. The MSPCA and Geese Peace will provide egg-oiling training and public education techniques to Boston volunteers. New "Please Do Not Feed the Birds" signs have been added to several parks and this effort will be further expanded into the Muddy River watershed. The feasibility of using trained Border Collie dogs to discourage geese from becoming a resident population in the parks is being evaluated by Boston.

7.4.1.9 Catch Basin Labeling

Gasoline, antifreeze, pet waste, cigarette butts, cleaning agents, pesticides, fertilizers, and trash are all pollutants that are illegally dumped on city streets. These pollutants are picked up by stormwater runoff that enters the storm drain system. The main purpose of catch basin labeling is public education and to prevent illegal dumping of contaminants into the storm drain system. Catch basin labeling is currently being conducted by BWSC and Brookline. The DCR is recommended to adopt similar regulations for "Don't Dump"

signs at catch basins receiving rehabilitation or new catch basins. These catch basin signs will be added to all DCR catch basins that are built as part of this project.

7.4.1.10 Enforcement of "Pooper-Scooper" Laws

Brookline and Boston need to pass and/or increase regulations that will strengthen enforcement and increase public awareness of the "pooper-scooper" laws. It is difficult to catch violators, so increasing public awareness will be essential. Brookline's new off-leash hours program for dog owners has provided an opportunity to increase the public's awareness of the pooper-scooper law, which currently is in effect in Brookline.

7.4.1.11 Review and Strengthen Stormwater Regulations

On July 9, 2003, Brookline submitted a Notice of Intent (NOI) to the DEP and EPA as part of the National Pollutant Discharge Elimination System (NPDES) Phase II General Permit Requirements for Small Municipal Separate Storm Sewer System (MS4). Brookline submitted a Stormwater Management Plan (SWMP) with the NOI. The SWMP contains the following BMPs: illicit discharge detection and elimination, public education, public participation, construction site runoff control, post construction site runoff control, and municipal good housekeeping. Four measures are listed to meet the illicit discharge detection and elimination component of the SWMP: create a storm drain system map, develop an illicit and illegal discharge program, develop an ordinance to regulate and enforce Infiltration and Inflow (I/I) discharges, and create a "hotline" for the public to report potential I/I discharges. A by-law regulating discharges to the storm drain system was passed at the Spring 2003 Town Meeting. The other BMPs are discussed in their respective sections of this report.

BWSC's NPDES permit was issued by the EPA and the DEP on September 29, 1999 and it became effective on October 29, 1999. Under the permit, BWSC is required to develop and implement a stormwater pollution prevention and management program that is designed to reduce the discharge of pollutants to the municipal storm drain system. BWSC's 2002 Stormwater Management Report discusses the following BMPs: illegal connection remediation; control of non-stormwater discharges to the drainage system; operation and maintenance of structural controls; development and construction sites; flood control projects; pesticide, herbicide, and fertilizer application; and public education.

7.4.2 Stony Brook Conduit

The Stony Brook Conduit (SBC) is one of the major features of the metropolitan Boston drainage system, and has a direct impact on the hydraulics and water quality of the Muddy River. The SBC is a seven-mile long storm drain extending from the Stony Brook Reservation to Boston Gatehouse (BGH) No. 1 on the banks of the Muddy River. It serves a 13 square-mile area, more than twice the size of the Muddy River watershed. Of the 13 square-mile area, the upper 10 square-mile area has a separate sewer system. The remaining lower area has a combined sewer system that will be separated by 2006. Throughout most of its length, the SBC is a single pipe; however, the pipe splits into two drains (the Commissioner's Channels) near the intersection of Parker and Prentiss Streets. At BGH No. 1, the channels revert back into a single pipe; the 12-foot diameter Foul Flow

Conduit. This conduit carries flow from BGH No. 1 to the MWRA's Charlesgate East Gatehouse which discharges through two outfalls to the Charles River.

The SBC has been undergoing dramatic changes that improve the flooding conditions as well as the water quality of the Muddy River. All of these measures will serve to improve the quality and reduce the frequency of stormwater discharges from the SBC.

The improvements in the SBC include:

- Boston Gate House (BGH) No. 1 renovations and operations designed to minimize flow by reducing frequency of discharges from the SBC to the Muddy River. In the past, SBC flow through BGH No. 1 would enter the Muddy River because the gates were always open. With the improvements in place, BGH No. 1 will now prevent SBC flow from reaching the Muddy River except during major storm events. During very large storms, there will be some flow from the SBC to the Muddy River for flood control purposes. Discharge to the Muddy River will only occur to prevent upstream flooding. This improvement significantly reduces the amount of sediment discharged to the Muddy River because stormwater is not typically reaching the Muddy River. The estimated typical frequency of discharge to the Muddy River from the SBC will be reduced from almost every storm to one or two times per year. The conservative estimate of flow to the Muddy River is 20 percent of the existing SBC flow, or an 80 percent flow reduction.
- Sewer separation. BWSC has undertaken a \$35.2 million project to separate the combined portion of the Stony Brook Sewer System tributary to the SBC, an area of 575 acres, to improve water quality in the Muddy and Charles Rivers. When completed in 2006, the SBC will convey only dry weather brook flow and stormwater. Wastewater with typically higher levels of pollution will be eliminated from the SBC.
- SBC Cleaning. SBC cleaning was completed at a cost of \$5.5 million in spring 2002. This improvement restored the capacity of the Stony Brook system and significantly reduced flooding. The improved capacity now allows more flow to continue downstream past the Muddy River outlet at BGH No. 1.
- Removal of Illegal Connections in the separated portion of the system. At the end of 2002, 172 illegal discharges in the SBC had been identified and removed. All illegal connections will be eliminated, thereby dramatically improving stormwater quality in the SBC. The total cost of the program, including the cost to correct the illegal connections, is estimated to be \$1.6 million.

The improvements in the SBC are considered a BMP since they are improvements that reduce the sediment load by reducing flow and sediment loads through operational changes, structural changes through separation, and maintenance improvements. The remaining small portion of flow that will discharge from the SBC into the Muddy River will have significantly reduced sediment loads because of the cleaning, separation, and illicit connection removal programs. Flow that does reach the Muddy River from the SBC will be from large storm events. These improvements in the Stony Brook Conduit are

ongoing and being made since they need to be done as part of improved operation rather than waiting for implementation as a part of this current project in the SFEIR.

Additional improvements to sediment load in the Stony Brook Watershed are anticipated as the city wide improvements in catch basin cleaning and street sweeping will ultimately also reduce sediment loads in the Stony Brook Conduit watershed. Those additional improvements have not been estimated for this SFEIR but are still a benefit to the Stony Brook Conduit watershed.

The annual sediment load from the SBC was determined by comparing it to the Village Brook Drain (VBD) sub-basin where the watershed management model was used to estimate the sediment load. The flow volumes for the SBC and VBD were compared for the 1-yr 6-hr storm. The flow volumes were estimated using typical rainfall amounts, in inches, and the watershed areas. Comparing the two flow volumes indicates that the flow volume for the SBC is approximately 55 percent of the flow volume from VBD, for this storm. Other storms would result in similar relationships for the SBC and VBD watersheds. Therefore, the annual sediment load from the SBC was estimated as 55 percent of the annual load from the VBD. This is also based on the assumption that the land use distribution in the two sub-basins is similar. The SBC sub-basin has more residential areas than the VBD sub-basin and therefore the estimated sediment reduction presented below is most likely lower (more conservative) than actual conditions. The residential areas trap more sediment in the land cover than industrial areas.

The annual sediment load from the VBD was estimated using the water management model as 584 cu yd. Given the relatively similar land use characteristics in the Village Brook and Stony Brook areas, SBC sediment loads were estimated using a proportional relationship based on the drainage areas (55%). The estimated annual sediment load from the SBC is 321 cu yd. In calculating the reduced sediment load the flow reduction in the Stony Brook Conduit is 80% based on improvements and operational changes. Instead of taking the full 80% reduction, only a portion of this reduction was assumed (56%) so as not to over estimate the benefit in Stony Brook Conduit. The sediment reduction planned for the Stony Brook Conduit is estimated to be 175 cubic yards. This conservative sediment reduction is 35 percent of the overall 500 cu yd annual sediment reduction. Reducing the sediment load to the Muddy River at this location (BGH No. 1) is particularly important because one of the proposed dredging locations is just after BGH No. 1. Reducing the sediment that enters the Muddy River here will lengthen the re-sedimentation process in the river, as well as reduce the amount of flooding.

The BGH No. 1 improvements previously discussed will reduce the total flow to the Muddy River from the SBC by an estimated 80 percent. The only stormwater that will reach the Muddy River from the SBC will be from very large storms. Since most of the pollutants are carried away in the first-flush of storms, the new operating conditions will prevent most of those first-flushes from entering the Muddy River. The stormwater reaching the Muddy River will be from later portions of the storms, when pollutant levels are more diluted.

Several comments were received to consider the sediment loading data obtained by the USGS. In general, contaminant loading data collected by the USGS in their 2002 study is more site-specific in comparison to data used to generate TSS loading estimates for the SBC in previous analyses (*Hydraulic Modeling, Sediment Quantity and Sediment Quality of the Muddy River*, prepared for the USACE by CDM in September 2000 and Sections 5.0 and 7.0 of the DEIR and FEIR prepared in 2002 and 2003).

The USGS monitoring station on the SBC is located upstream of several combined sewer overflows (CSOs) that discharge downstream of the monitoring station. The USGS station in the SBC (01104687) is located just downstream of the Boylston Street CSO regulator and upstream of several other major CSO regulators on the SBC. On page 56, the USGS notes that “water quality samples collected at both the Muddy River and SBC may not accurately reflect concentrations at the mouth, in particular for Stony Brook, due to CSOs that discharge downstream of the USGS gauging station.”

The total TSS load for the Stony Brook overflow for Year 2000 is presented in Table 27 of the USGS report (pg 124). Three values are presented for the stormwater overflow, an average value, weighted average value, and an annual load computed using regression analysis. These loads are 34,200, 20,100, and 21,900 kilograms per year, respectively. Converting the loads from the Stony Brook overflow from kilograms per year to cubic feet per year results in loads of 37.0, 21.9, and 23.8 cu yd per year, for average, weighted average, and regression analysis methods, respectively. Comparison of this value to the 321 cu yd per year estimated in the previous CDM analysis shows Stony Brook loads computed in the USGS analysis are significantly lower. Considering that the USGS already admits their data may not be representative, and that the loadings appear very low in comparison to other published data, the CDM data will be used for this analysis.

7.4.3 Treatment Control BMPs

For the highly urbanized Muddy River watershed the proposed treatment control BMPs are bioretention areas, swales, and particle separators. The proposed particle separators listed in this report will be designed with consideration of the pilot study results and in compliance with the Stormwater Management Guidelines. Site selection and cost were evaluated during the preliminary design stage for all treatment control BMPs. Additionally, the proponents will continue to consider technology developments for future treatment control BMPs as well as techniques such as low impact development where appropriate.

7.4.3.1 Treatment Control BMP Site Selection

The Center for Watershed Protection (CWP) included 19 potential sites for structural BMPs in the Village Brook sub-watershed in the Lower Charles River Basin Retrofit Inventory (July 1999). The CWP program did not represent a complete program of structural BMPs to meet a specific goal of water quality but was a first step in identifying technologies to improve water quality.

Sites previously identified by the CWP were revisited in October 2002. Each site was evaluated for feasibility based on the following criteria: accessibility, available space, land

use, land ownership, and utilities. Accessibility for maintenance and the current land use helped to determine if a BMP would adversely affect the public's use of the land. The available space for a BMP was also evaluated and if the space was not adequate for a measurable amount of sediment removal, the site was disqualified. Due to access and liability issues, private land was not considered for potential BMP sites. Of the 19 sites evaluated by the CWP in 1999, 14 were included as potential sites in the structural BMP plan.

Improvements to source control BMPs and SBC improvements are estimated to account for approximately 55 percent of the needed 500 cu yd sediment reduction to meet the overall sediment reduction goal of 30 percent to the Muddy River. This requires structural BMPs to account for 45 percent (225 cu yd) of the needed 500 cu yd annual sediment reduction.

In order to achieve this goal, additional sites beyond what the CWP identified in its 1999 study were evaluated. The recommended structural BMP plan is comprised of four main components:

- Sites evaluated based on CWP initial identification;
- Additional sites identified in October 2002;
- Particle separators located in public ways; and
- Continuing regulations that require structural BMPs on new and re-developed privately owned land.

A field evaluation of approximately 60 sites, including the CWP sites, was conducted in September and October 2002. Potential sites were identified using GIS data obtained from Boston and Brookline. Using the GIS data, publicly owned open space was identified. Potential sites were field-checked for criteria such as accessibility, available space, cost, land ownership, land use, and utilities. The sites were further reviewed by municipal officials for compatibility with current land use and integration with current operations. The sites considered and reasons for deletion are summarized in Table 7-9, presented at the end of this chapter. Three sites selected for further evaluation of structural BMPs are summarized in Sections 7.4.3.3 and 7.4.3.4.

Sediment control in the Muddy River watershed is classified as an urban area retrofit project. The use of particle separators as the most frequent structural BMP allows the treatment of many sub-drainage areas without compromising the development of the urban environment or incurring prohibitively high costs. The balance between the existing urban development, the acknowledged necessity of sediment control, and cost must be maintained. Additionally, particle separators are relatively easy to maintain with existing staff and equipment. In many cases, properly designed units are compact and can fit within roadways. The effectiveness of structural BMPs is expected to increase as the technology improves.

The existing public land remaining in the watershed is mainly comprised of streets and parks. Streets are preferred locations for particle separators; roadways are public property, accessible, and utilities can be relocated when necessary. Installation can sometimes be done at the discharge end of a storm drain system, although discharge control tends to require larger structures. Compromising the Emerald Necklace Park system to install other BMPs is counter-productive of the historic restoration goal. Installing BMPs in other park settings needs to be carefully considered since installation can disrupt the park environment and frequent maintenance can be disruptive as well. Innovative treatment systems (filtration and infiltration technologies) are contingent on land availability as well as maintenance funding and specialized skills to maintain these systems.

Additional sites for particle separators could include areas where the storm drain system is modified to prevent runoff over curbs. During design of drainage system improvements to correct DCR curb settings and pavement settling, consideration should be given to installing a particle separator as part of the construction.

Some of the comments received on the DEIR and FEIR suggested that a treatment BMP be considered at the end of the Village Brook drain and possibly other major drains into the Muddy River. The original proposal in the CWP document of a weir and forebay was reviewed and also evaluated a more traditional particle separator. Typically, end of pipe treatment systems are not feasible for larger drainage areas.

The Village Brook drainage area is approximately 2,085 acres and the flow rate at the end of the drain is estimated to be 328 cfs for a 2 month, 1 hour storm (0.4 inches per hour) and 1,354 cfs for a 10 year, 1 hour storm (1.65 inches per hour). These values are based on the impervious area used in the WMM model and the approximation of a 1 hour time on concentration in the basin. A 2 month storm would be the usual design for a particle separator and a 10 year storm was tested to see how some of the higher flow rates would impact the BMP.

Particle separators used to remove 80 percent solids are sized at approximately 10 gpm per square foot. This results in an upflow velocity of about 0.023 feet per second (fps), a relatively slow velocity allowing particles to settle out. A separator sized for the 2 month storm would have to be about 14,700 feet square or roughly 121 feet on a side. Allowing for construction and maintenance access, a site approximately 140 feet on a side would be required. The distance from Pond Avenue down to the shore of Leverett Pond is 140 feet in the area of the Village Brook drain, so that a particle separator would take up the entire park area from Pond Avenue to Leverett Pond. This is clearly not feasible. This design would handle 2 month storms and have to be an off line facility, meaning that solids from larger storms would largely pass through into Leverett Pond. Smaller particle separators located upstream in the drainage area are more feasible for removing sediment in the Village Brook drainage basin.

The CWP forebay alternative was reviewed assuming a weir approximately 50 feet long across a forebay that was 30 feet from the discharge outlet to the pond. This arrangement

is about 20 feet wider than the current opening and about the same distance from the drain to the pond. In this situation the upflow velocity would be about 0.2 fps, or about 10 times the rate of a particle separator. While the velocity is not extremely high, it would result in significantly less removal of fine material. Of greater concern with the forebay concept is that since the structure is in line, storms of larger flows also have to pass through the structure. Setting aside the potential hydraulic losses imposed by the weir, in a 10 year, 1 hour storm, the upflow velocity increases to nearly 1.0 fps and the velocity over the weir is in excess of 6 fps. Flow at these velocities would scour the forebay and dump the solids into Leverett Pond. A forebay taking up a significant portion of the park at the Village Brook drain would be needed to reduce the velocities to anywhere near a point to effectively settle out solids.

7.4.3.2 Present Worth Analysis

A present worth analysis was performed to compare the estimated costs of different structural BMP scenarios. The life cycle used for this analysis was 20 years and the interest rate was set at 3.5 percent. The first scenario consists of the recommended structural BMPs presented in the FEIR. This scenario has a significant component of particle separators with some of the other structural BMPs. The second scenario evaluates the program with fewer particle separators and more of the other structural BMPs, while the third scenario presented does not include any particle separators. Table 7-10 presents the estimated present worth costs for the three scenarios.

Table 7-10
Cost Comparison for Structural BMPs

Scenario	Description	Present Worth Cost	Present Worth Cost per cu yd
1	220 cu yd removed by particle separators, 5.6 cu yd removed by other structural BMPs	\$3,237,850	\$720/cu yd
2	80 cu yd removed by particle separators, 145 cu yd removed by other structural BMPs	\$5,700,860	\$1,270/cu yd
3	225 cu yd removed by other structural BMPs	\$7,515,820	\$1,670/cu yd

The costs for each particle separator, as well as the other structural BMPs, were based on vendor unit costs, construction contingencies, and utility replacement. The maintenance costs for each structural BMP were also included in the present worth analysis.

Particle separators have the lowest capital and maintenance costs per volume of sediment removed, and therefore have the lowest total present worth cost. The average present worth maintenance cost for particle separators is approximately 30 percent of the other structural BMP maintenance costs, on a volume basis. Maintenance can be completed using existing staff and equipment. With particle separators being the most cost effective BMP for removing particulate matter, the recommended plan should be heavily weighted toward particle separators. Other structural BMPs may address other water quality

parameters to a greater extent and they will continue to be considered for implementation as part of this project. However, the principal purpose of the BMP plan is to extend the life of the Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project.

7.4.3.3 Bioretention

Bioretention areas are useful in treating small drainage areas and are particularly useful as retrofits in existing parking lots. Bioretention areas are landscaping features adapted to provide onsite treatment of stormwater. Surface runoff is directed into shallow, landscaped depressions. These depressions are designed to incorporate many of the pollutant removal mechanisms that operate in forested ecosystems. During storms, the design volume of runoff is collected above the filter, and percolated through the mulch and prepared soil mix. Stormwater exceeding the design volume bypasses the filter. Typically, the filtered runoff is collected in a perforated under-drain and returned to the storm drain system. Bioretention areas have few constraints and can be applied to most development and re-development sites, including highly urbanized areas. They are commonly located in parking islands or within small pockets of residential land. Bioretention areas can be an aesthetic benefit if well designed, but they require frequent maintenance (more frequent than particle separators) to maintain plant health and prevent clogging of the soil pores and the under-drain system.

One bioretention location has been proposed for the Muddy River watershed at the Heath School parking lot in Brookline. Based on factors like drainage area and land imperviousness, the estimated amount of sediment removed was calculated. The bioretention BMP has a sediment removal efficiency of 70 percent. Using equations 7.1 and 7.2, with this removal efficiency, the proposed bioretention area is expected to remove 1.6 cu yd of sediment per year.

7.4.3.4 Swales

Swales require significant land area and are not feasible in many urban locations. However, swales are very effective for treating road and highway runoff because they are linear structures. Swales can be less expensive than curb-and-gutter systems but require more maintenance (more frequent than particle separators). Although swales can accentuate the natural landscape, they should be gradually sloped and well vegetated to avoid the appearance of a ditch. Dry swales are a series of vegetated, open channels designed specifically to treat and attenuate stormwater for a specified water volume. As stormwater flows through these channels, it is treated through filtering by the vegetation in the channel, filtering through a subsoil matrix and/or infiltration into the underlying soils. In addition, the velocity of the stormwater is reduced before it is discharged, allowing sediment to settle.

Two swales are proposed for the Muddy River watershed. A dry swale is proposed at Dudley Triangle and a swale at Victory Gardens. Based on equations 7.1 and 7.2 and a sediment removal efficiency of 70 percent, the two swales are estimated to remove 2.2 cu yd per year.

7.4.3.5 Particle Separators

Particle separators use fluid dynamics within a pre-designed unit to separate stormwater with solid contaminants, including suspended sediment, floating debris, oil and grease, and vegetative materials. A number of proprietary products exist, including Bay Saver, CDS (continuous deflective separation) Units, Stormceptor, Vortech, HydraSep, and Aqua-Swirl. The units are designed based on the drainage area controlled and a specific storm size. The units are maintained by removing solids either by vacuum truck or clamshell truck, and require cleaning approximately twice per year.

Pilot Study Description

As part of this project, a BMP pilot program was conducted to evaluate the ability of particle separators to remove solid particles, oil and grease from stormwater runoff as compared to manufacturer's recommendations. The results of the pilot program would be used to in the design and implementation of particle separators and other structural BMPs in the Muddy River watershed.

The reported high TSS removal rates combined with a relatively small footprint area and low capital costs make particle separators a viable option when considering structural BMP solutions for the Muddy River. One benefit of particle separators is the capability to place them in streets that are already in the public right of way. Additionally, the proponents already have maintenance vehicles that can be used to maintain the new particle separators.

Treatment capabilities of particle separators will evaluate the by monitoring four existing separators in the watershed. The objective of the pilot program was to confirm whether the manufacturers sizing recommendations are reasonable in designing the BMP program or whether modifications are needed since the costly sediment reduction program is dependent on these particle separators. The four-separators selected for the program are summarized in Table 7-11.

Table 7-11

Particle Separators in the Muddy River Watershed Monitored for the Pilot Program

<i>Location</i>	<i>No.</i>	<i>Ownership</i>	<i>Drainage Area</i>	<i>Design Flow Capacity</i>
Intersection of Perkins Street and Parkman Drive, adjacent to Jamaica Pond, Boston	1	Boston Parks Department	20 acres	11 cfs
Fenwood Road, approximately 50 feet from intersection with Brookline Avenue, Boston	2	BWSC	30 acres	No info
Cypress Street, approximately 50 feet east of intersection with Franklin Street, Brookline	3	Brookline DPW	85 acres	12 cfs
Parking lot near Walnut Street, near intersection with High Street, Brookline	4	Brookline DPW	30 acres	25 cfs

The Vortechs stormwater treatment system, manufactured by Vortechtechnics, is used in three of the four particles separators being monitored in the pilot program. These separators consist of four treatment chambers: a grit chamber, oil chamber, flow control chamber, and outlet chamber. The grit chamber is designed to direct the influent stormwater in a swirling motion. The swirling motion causes the suspended solids to be drawn to the center of the grit chamber (also called the swirl chamber) where they settle out of the stormwater. The fourth pilot program separator, located on Fenwood Road, is a BWSC designed unit. This separator uses three treatment chambers to settle out solids and trap floatable materials like oil and grease.

As described in the Particle Separator Monitoring Plan (CDM, October 2003) submitted to the Massachusetts Department of Environmental Management, the pilot program proposed to monitor the four particle separators for pollutant removal effectiveness during 12 storm events – three during each season for a one-year period. Samples would be collected throughout the duration of the storms at manholes immediately upstream and downstream of each particle separator to estimate the TSS and oil and grease removal efficiencies. The samples would be analyzed for TSS as well as oil and grease in order to estimate the TSS and oil and grease removal efficiencies of each separator. Flow measurements would also be recorded during the storm events to enable estimation of the loads experienced by the separators.

In between sampling events, the sediment level in each particle separator were measured to track the buildup of particles and determine if sediments are re-suspended and “washed-out” during major storm events. These measurements were performed during the sampling of storm events. A particle size distribution analysis of the sediments captured by each particle separator was also conducted during the project. Rainfall in the area, conditions of the sub-drainage basin (street sweeping activity, catch basin cleaning, etc.), and conditions of the separator before and after the storm event were monitored and recorded throughout the project.

Pilot Study Results

The four pilot study particle separators (PS) were monitored during five storm events that took place between November 20, 2003 and July 13, 2004. Table 7-12 presents a summary of the rainfall data associated with the storms.

Table 7-12
Pilot Study Storms

Storm Event	Date	Total Rainfall (in)	Storm Duration	Sampling Duration	Average Intensity (in/hr)
1	Nov. 20, 2003	0.29	4:00 am - 9:30 am	6:00 am – 12:00 pm	0.053
2	Dec. 17, 2003	0.34	2:30 pm – 12:00am	2:30 pm – 1:00 am	0.036
3	Feb. 3, 2004	0.44	7:30 pm – 12:00 pm	7:30 pm – 12:00 am	0.098
4	April 13, 2004	1.97	12:54am – 11:54 pm	7:20 pm – 11:54 pm	0.086
	April 14, 2004	0.26	1:19 am– 11:01 pm	1:55 pm – 4:40 pm	0.012
	April 15, 2004	0.06	2:54 am – 12:54 pm	9:10 am – 0:50 am	0.006
5	July 13, 2004	0.17	1:54 am – 11:54pm	2:00 pm – 12:00 am	0.008

Six rounds of total suspended solids (TSS) samples, oil and grease samples, depth measurements, and velocity readings were taken at each particle separator during the storm events. Variations from the six rounds of sampling only occurred if there was an inadequate amount of flow in a separator. For example, rainfall during Storm Event No. 1 ended approximately halfway through sampling and this led to extremely low flows in the particle separators during rounds three through six. The low flows made it difficult to measure velocity and collect samples.

In addition to the storm event sampling, particle depth measurements were made in each separator following the monitored storm events. An additional round of depth measurements was also made in mid-December 2003 after an unmonitored storm event of significant size (0.69 inches of total rainfall) occurred.

During the last round of particle depth measurements, sediment samples were collected from the particle separator grit chambers. There was not enough sediment in Particle Separator No. 1 to collect a sample; therefore, a sediment sample was collected from the downstream manhole. The reason for the large amount of sediment accumulation in the downstream manhole is unknown; however, it may be the result of previous construction activities in the area. CDM has recommended to BWSC that they clean out this manhole.

Removal results in the particle separators are summarized on Table 7-13. Removal efficiencies are expressed on the basis of total suspended solid load entering and leaving the separator during the storm monitoring period. As can be seen, the removal

efficiencies are variable and many are negative indicating either poor data or wash out. Table 7-13 also shows the percent full of the separator based on the sediment measurements during the pilot testing. Several observations from the pilot program are:

Table 7-13
Particle Separator Removal Efficiencies

<i>Particle Separator</i>	<i>Estimate Area (Acres)</i>	<i>Estimate % Removal</i>	Percent Removal Efficiency from Pilot Program				
			<i>Percent Particle Separator Full</i>				
			<i>Storm #</i>				
			1	2	3	4	5
1	20-25	60%	67%	16%	-7%	-112%	32%
			2%	2%	7%	17%	39%
2	30	---	-22%	2%	3%	0%	-10.40%
			15%	20%	15%	15%	15%
3	85	18%	68%	20%	-28%	1%	65.90%
			29%	39%	37%	42%	80%
4	30	73%	---	9%	46%	-2.50%	18.90%
			78%	85%	86% ¹	7%	4%

Notes: ¹Cleaned following storm event

- Problems accurately measuring the flow velocity were most frequently due to low flows in the particle separators that did not submerge the flow meter. To improve the accuracy of the velocity measurements, new flow meters were used. These flow meters were calibrated and tested prior to operation in the field to ensure that they are accurate and are operated correctly. In addition, an increased emphasis was made to capture storms events that are predicted to have a large amount of total rainfall. These modifications did not correct the problem and most storms were of fairly low intensity.
- The sediment depth in three of the units seemed to increase quickly after the October 28, 2003 cleaning and then level off. This could be an indication that sediment re-suspension is taking place in these separators. Particle separator number 4 was cleaned again following the February 3, 2004 storm and did not accumulate significant sediment after the second cleaning.
- Downstream TSS concentrations were often higher than upstream concentrations. One potential explanation for this is the re-suspension of sediment in the particle separators. In the case of Particle Separator No. 1, located near Jamaica Pond, re-suspension could be the result of the large amount of settled sediment in the downstream manhole.
- According to the particle size distribution analysis, the vast majority of sediment removed by the separators was in the size range of fine gravel to fine sand (12 mm to 0.08 mm).

Results from the pilot test were disappointing from several respects. First, the difficulty in accurately measuring the flows and sediment removal rates under field conditions made the results less useful than hoped. Second, the results appeared uniformly low suggesting that the units were either not performing as planned or not installed in accordance with guidelines for particle separator use. The installation of the Vortech units was reviewed as discussed in the following section.

Evaluation of Existing Vortech Particle Separators

Vortech particle separators were installed in three of the four locations monitored as part of the Muddy River pilot study. These separators consist of four treatment chambers: a grit chamber, oil chamber, flow control chamber and the outlet chamber. The grit chamber is designed to direct the influent stormwater in a swirling motion. The swirling motion causes the heavier suspended solids to be drawn to the center of the grit chamber (also called the swirl chamber) where they settle out of the stormwater.

Vortech units are approved under the STEP process for removing 80 percent of suspended solids and are sized by finding the flow rate that enables the unit to meet the desired removal efficiency.

Vortech units are sized by finding the flow rate that enables a desired percent removal of TSS to be achieved. By setting the desired removal rate at 80% and estimating the flow

into the unit with the rational rainfall method, Vortech developed the following sizing equation:

$$\text{Grit Chamber Area} \geq (C \cdot A \cdot 448.83 \text{ gpm/cfs}) / \text{Design Ratio} \quad (\text{Eq.1})$$

Where: A = the drainage area (acres)
C = Site runoff coefficient
Design Ratio = developed by Vortech

The design ratio is the Vortech operating rate (gpm/ft²) divided by the local characteristic rainfall intensity. Based on laboratory data and rainfall intensity plots, Vortech calculates regionally specific design ratios to achieve an average annual removal efficiency of 80%. The appropriate Vortech model is then selected using the grit chamber area calculated in Equation 1.

After determining the Vortech model to use, one must then decide whether the system should be "on-line" or "off-line". Vortech recommends the following steps to determine the appropriate configuration of the Vortech model:

1. Calculate the flow rate resulting from an infrequent (10-15 year recurrence interval) storm on your site.
2. Compare this flow rate to the peak treatment capacity of the model selected.
3. If the storm flow rate is greater than the treatment capacity, either configure the Vortech model as an off-line system, or select a larger model that can meet the storm's flow rate. The choice between an off-line model or a larger on-line model is typically determined by economics.

The three Vortech particle separators being monitored in the pilot program are off-line systems. The design capacity of the systems are known, which enables us to estimate the grit chamber area of each system. After also estimating the drainage area and runoff coefficient at each site, we can utilize the Vortech sizing methodology to estimate the percent removal of TSS (See Table 7-14)

Table 7-14
Vortech Particle Separators-Estimates of Current Operating Parameters

Number	Runoff Coefficient	Drainage Area (acres)	Design Capacity (cfs)	Grit Chamber Area (sf)	Design Ratio	Annual % TSS removal
PS 1	0.655	22	11	50	129	60
PS 3	0.69	85	12	50	527	18
PS 4	0.725	30	25	113	86	73

As shown in Table 7-14, the estimated percent removal of TSS is less than 80% for each of the separators. The highest estimated percent removal is in PS 4. This unit, located in a parking lot off Walnut Street, has the largest grit chamber area of the three Vortechs units. Its increased sedimentation area enables it to achieve a higher removal rate than the other separators.

Since all of the Vortechs units are sized for less than 80% removal it is not surprising that the field results are lower than expected. When you look at the rainfall intensities for the storms monitored however, the results should be close to 80% since all but the third storm are of low intensity.

Recommendations for Particle Separator Selection

As a result of the pilot study there are several recommendations concerning selection of particle separators:

- Design and placement of the separators should follow the design recommendations of the manufacturer of STEP approved units. This is not the case for some of the existing units.
- Particle size distribution data seems to indicate that the sediment from the Muddy River watershed has more fines than expected so the units should be sized larger to capture a higher portion of these fines. This data should also be confirmed with more data on sediment from the separators.
- The units be designed for 80 percent removal efficiency, however until more data on amount of sediment removed is available, the number of units in the BMP plan should be based on a more conservative 70 percent removal efficiency. This conservative approach will provide more units in the overall plan.
- Data on sediment removed from the separators during cleaning should be maintained to document the actual sediment removed from the drainage area and provide information on the operation of the separators under field conditions.

Particle Separators to Achieve Sediment Removal Goal

In addition to the recommended improvements to source control measures, SBC improvements, and the structural BMPs discussed previously, installation of new particle separators will be required to achieve the 30 percent sediment reduction goal. The new particle separators will need to reduce the sediment load by 220 cu yd per year in the Muddy River watershed. This section evaluates the number, size, and location of particle separators required to remove the remainder of the sediment load.

Depending on the imperviousness of the drainage area, particle separator units will treat areas ranging from 10 to 20 acres, with the ultimate goal of controlling approximately 410 acres. Each particle separator will be designed with the capacity to treat a 2-month storm, and enough particle separators will be installed to remove the remaining 220 cu yd of sediment load. With these treatment goals as guidelines, sizing criteria can be established to determine the recommended quantity and capacity of particle separators in the Muddy River watershed.

To determine the number of particle separators needed to reach the sediment reduction goal, the removal efficiency of the separators must be calculated. The TSS removal efficiency of particle separators is heavily dependent on the particle distribution of the stormwater runoff in the Muddy River watershed. Based on five published reports of typical particle size distributions for stormwater runoff, including a study by the EPA and the Massachusetts Highway Department, a particle size distribution representative of runoff in the Muddy River Watershed was estimated.

After estimating the Muddy River runoff particle size distribution, laboratory efficiency tests performed by Vortechtechnics and reviewed by the Strategic Technical Environmental Partnership (STEP), along with Equations 7-1 and 7-2 and associated factors like drainage area, were then used to estimate the annual TSS removal efficiency of proposed particle separators in the Muddy River watershed. The average TSS removal rate used to calculate the amount of sediment removed by the particle separators was 70 percent. Table 7-15, presents the estimated annual TSS removal at 10 proposed particle separator sites. Also shown in the table is the estimated number of particle separators, in addition to the 10 sites, that will be needed to reduce the Muddy River sediment load by 220 cu yd per year.

As shown in Table 7-15, based on five years of New England rainfall data, Vortechtechnics efficiency testing, and the Muddy River particle size distribution, it is estimated that 28 new particle separators will be needed to remove 220 cu yd per yr of sediment load from 410 acres in the Muddy River watershed.

The calculations presented in the table reflect the expected performance with no accumulated sediment in the separator. In real world applications, some sediment will exist in the separator, and re-suspension of settled sediment is likely to reduce performance. Therefore a more conservative estimate was provided in the last two columns of Table 7-14. This estimate of separator performance indicates that the 28 new separators (10 with proposed sites, 18 with unknown sites) will reduce the sediment load by 220 cu yd per yr. Adding this reduction to the 275 cu yd removed by non-structural BMPs gives the 500 cu yd needed to achieve the 30 percent reduction goal.

While it is estimated that 28 particle separators will be needed to remove the remaining sediment load, the proponents are committed to the 30 percent sediment reduction goal and will implement additional separators or alternative BMPs to achieve this goal. Furthermore, the 10 proposed sites listed in Table 7-14 are preliminary and may change when field conditions are further examined. Sites for the remaining 18 particle separators will be selected as the units are designed, with aid from the pilot study results. Additional sites for particle separators could include areas where the storm drain system is modified to prevent flow over curbs. During design of drainage system improvements to correct curb settings and pavement settling, consideration should be given to installing a particle separator as part of the construction. The proponents will encourage private developers to provide BMPs to control runoff as part of using both public and private resources to reach the goal of controlling an additional 410 acres of drainage area.

Table 7-15
Proposed Particle Separators
Estimate of TSS Removal Efficiencies

Municipality	Sub-watershed	Drainage Area (acres)	Average		Recommended Vortechs Unit (Model Number)	Estimated Performance ⁽³⁾		Conservative Estimate	
			% Impervious	EMC ⁽¹⁾ (mg/L)	RL ⁽²⁾ (in/yr)	Removal Efficiency ⁽⁴⁾ %	Sediment Removed (yd ³ /yr)	Removal Efficiency %	Sediment Removed (yd ³ /yr)
Boston	DF-1	14.5	70%	269	29.7	85	11.1	70	9.1
Boston	HU-1	14.3	70%	269	29.7	86	11.1	70	9.0
	RV-1 and								
Boston	RV-2	19.8	65%	269	28.2	83	14.0	70	11.8
Boston	VB-3	10.6	65%	269	28.2	91	8.2	70	6.3
Brookline	LW-1	15.78	65%	269	28.2	85	11.4	70	9.4
Brookline	TB-3	12.55	65%	269	28.2	84	9.0	70	7.5
Brookline	VB-4	10.83	65%	269	28.2	85	7.8	70	6.4
Brookline	VB-4	13.48	50%	269	23.6	85	8.1	70	6.7
Brookline	CS-1	6.58	30%	269	17.4	92	3.2	70	2.4
Brookline	MR-1	11.3	50%	269	23.6	87	7.0	70	5.6
Subtotal		129.72					91.0		74.2
					18 units of				
Remaining Area	Various	280	54%	269	24.7	87	181.4	70	146.0
	16.1 acres/ea								
Total		410					272		220

Notes:

1. Event mean concentration
2. Average annual surface runoff. Assumes runoff coefficient of 0.95 for impervious areas and 0.2 for pervious.
3. Assumes that the particle separators are properly maintained, and that a minimal amount of settled sediment is in the separator.
4. Calculated using estimated particle size distribution for Muddy River runoff in conjunction with STEP-approved Vortechs efficiency testing, also uses five years of Maine rain gauge data from Vortechs.

The results presented above are preliminary, and as agreed upon with the Charles River Watershed Association, it is recommended that the pilot study be completed before the installation of the particle separators. The proponents will use the results of the pilot study to make certain the most effective BMPs are put in place to protect the Muddy River.

Additional Particle Separators

Several other particle separators, in addition to the 28 recommended to meet the sediment removal goal, have been proposed for critical areas within the watershed. These will be designed after the results of the particle separator pilot study are analyzed.

A particle separator is recommended for installation at the outlet of the Emmanuel College Drain. The particle separator will be designed to treat a portion of the maximum flow of 62 cfs to remove sediment from most storms and bypass excess flow from maximum storms. A second and similar particle separator for another area in the Back Bay Fens is also recommended. A particle separator is recommended for installation at the Daisy Field outfall culvert at Leverett Pond. This particle separator will be designed to treat a portion of the maximum flow of 28 cfs to remove sediment from most storms and bypass excess flow from the maximum storms. BWSC will be responsible for monitoring and maintenance of these particle separators and construction will be part of the capital improvement program.

The Chestnut Street drain is a significant source of sediment to Willow Pond and therefore to the Muddy River. Field reconnaissance as part of this project shows a large sandbar in very close proximity to the drain outlet. A particle separator is recommended for installation at the outlet of the Chestnut Street drain to trap some of the sediment before it enters Willow Pond. This particle separator will be part of Brookline's capital improvement plan.

Water quality samples taken by field staff during dredging in Fall 2002 indicated high levels of total suspended solids in drainage from the Massachusetts Turnpike. The proponents will discuss with the Massachusetts Turnpike Authority the possibility of installing a particle separator to treat this drainage before it enters the Muddy River at Charlesgate.

7.4.3.6 Summary of Treatment Control BMPs

As previously discussed, two structural BMPs other than particle separators are proposed for this project: bioretention and swales. The bioretention and swale BMPs have sediment reduction efficiencies of 70 percent. Table 7-16 presents the three sites proposed for swales and bioretention along with the estimated sediment removals.

Table 7-16
Summary of Potential BMP Sites

<i>Municipality</i>	<i>Site</i>	<i>Sub-watershed</i>	<i>Drainage Area</i>	<i>BMP Type</i>	<i>Estimated Annual Sediment Removal (cu yd)</i>
Brookline	Dudley Triangle	VB-11	8	Dry Swale	1.6
Brookline	Heath School Parking Lot	VB-13	2	Bioretention	3.4
Boston	Victory Gardens	BBF-1	4	Swale	0.6
Total			5.6 cu yd 1.1 percent of 500 cu yd reduction goal		

Table 7-17 summarizes the approximate sizes and estimated annual sediment reduction for the 10 proposed particle separator sites and the additional 18 separators with unknown sites.

Table 7-17
Proposed Sites for Particle Separators

<i>Municipality</i>	<i>Sub-watershed</i>	<i>Drainage Area (acres)</i>	<i>Approximate Location</i>	<i>Approximate Unit Size (L x W, ft)</i>	<i>Estimated Annual Sediment Removal (cu yd)</i>
Boston	DF-11	14.5	Jamaica Way at Bynner Street	18 x 12	9.1
Boston	HU-1	14.3	Calumet Street near Tremont Street	18 x 12	9.0
Boston	RV-1 and RV-2	19.8	Pilgrim Road at Brookline Avenue	18 x 12	11.8
Boston	VB-3	10.6	Colbourne Road at Ransom Road	18 x 12	6.3
Brookline	LW-1	15.8	Longwood Playground	18 x 12	9.4
Brookline	TB-3	12.6	Kent Street and Brook Street	16 x 10	7.5
Brookline	VB-4	10.8	Washington Street and Cypress Street	16 x 10	6.4
Brookline	VB-4	13.5	Cameron Street	16 x 10	6.7
Brookline	CS-1	6.6	Kendall Street and Prince Street	14 x 8	2.4
Brookline	MR-1	11.3	Pond Ave.	16 x 10	5.6
18 Additional Units	Various	Total = 280		Various	146
Total		410	220 cu yd, 35 percent of 500 cu yd reduction goal		

As noted earlier, the results of the pilot program will be used along with the estimated sediment reduction loads presented in Tables 7-15 and 7-16 to make certain that the most effective BMPs are put in place to protect the Muddy River. In conjunction with the non-structural BMPs, the structural BMPs presented above will be employed to achieve the 30 percent sediment reduction goal in the watershed.

7.5 BMP Plan Costs

As mentioned in the beginning of this section, the goal of the BMP program is to reduce the sediment loading to the Muddy River by 30 percent, or from an estimated 1,675 cu yd per year in 2000 to 1,173 cu yd per year within 5 years from the issue of a certificate. Improved source control measures contributing to the 30 percent reduction include:

- Construction site controls - expected reduction 100 cu yd (20 percent)
- Stony Brook Conduit - cleaning and improvements - expected reduction 175 cu yd (35 percent)
- Structural BMPs - expected reduction 225 cu yd (45 percent)

Table 7-18, at the end of this chapter, presents the estimated capital and maintenance costs for the recommended source and treatment control BMPs. These costs are presented in 2003 dollars.

The estimated cost for each structural BMP is listed in Table 7-19. Costs include initial capital costs for construction, including equipment, contingencies and engineering, but do not include any cost for land taking or other site-specific costs. For particle separators, an allowance (not based on site information) for moving two utilities at each site was also included. The allowance for utility relocation was based on cost data for existing particle separators constructed in Brookline. These costs are presented in 2003 dollars.

Table 7-19
Estimated Costs of Structural BMPs

Structural BMP	Municipality	Location	Capital Cost¹	Annual Maintenance Cost
Bioretention	Brookline	Heath School Parking Lot	\$19,000	\$2,395
Dry Swale	Brookline	Dudley Triangle	\$53,000	\$4,045
Dry Swale	Boston	Victory Gardens	\$112,000	\$4,340
Particle Separator	Boston	Jamaica Way at Bynner Street	\$124,200	\$1,560
Particle Separator	Boston	Calument Street near Tremont Street	\$124,200	\$1,560
Particle Separator	Boston	Pilgrim Road at Brookline Avenue	\$124,200	\$1,560
Particle Separator	Boston	Colbourne Road at Ransom Road	\$124,200	\$1,560
Particle Separator	Brookline	Longwood Playground	\$124,200	\$1,560
Particle Separator	Brookline	Kent Street and Brook Street	\$81,000	\$1,560
Particle Separator	Brookline	Washington Street and Cypress Street	\$81,000	\$1,560
Particle Separator	Brookline	Cameron Street	\$81,000	\$1,560
Particle Separator	Brookline	Kendall Street and Prince Street	\$81,000	\$1,560
Particle Separator	Brookline	Pond Ave.	\$81,000	\$1,560
18 Additional Particle Separators	Boston and Brookline	Various	\$2,212,200 (\$122,900 each)	\$28,000 (\$1,560 each)
Total Structural BMPs			\$3,422,300	\$54,380

1. Unit costs for particle separators from vendor. Costs for other structural BMPs derived from the Center for Watershed Protection. *Costs and Benefits of Stormwater BMPs* (1998) and escalated to represent 2003 dollars and rounded to the nearest thousand dollars.

The total capital cost of the structural BMP program is \$3,422,300. Approximately \$1,210,000 of the program consists of identified swales, a bioretention area and 10 particle separators. The Town of Brookline has committed to installing six particle separators, outlined in Table 7-18, as the first component of the BMP program. The remainder of the program includes another 18 particle separators to address runoff from about 238 acres. The number of particle separators installed may change to meet the proposed sediment removal goal for the watershed.

The locations of the 18 undefined particle separators will be selected during design to take into account drainage area, available space, and utility location to control costs of these additional separators. The results of the pilot study will also be considered during location selection for these particle separators. Furthermore, in areas where drainage system reconstruction is required to correct curb settings and pavement settling, consideration will be given to constructing particle separators as part of the modified drainage system. The particle separator recommended to control drainage from the Massachusetts Turnpike near Charlesgate will not be included in the project costs.

7.5.1 Funding and Maintenance Reporting

The responsibility for funding, enforcement and monitoring of BMPs rests on the project proponents. The Memorandum of Understanding (MOU) among all parties and the Annual Update report to MEPA are the two vehicles that will ensure that BMPs will be completed. The MOU delineates the responsibilities of the signing parties to implement and fund BMPs including ongoing maintenance. The document provides an enforceable agreement to meet these obligations. Parties to the MOU have proposed their actions in the DEIR and that will be the basis for delineating responsibilities.

Comments from the FEIR suggest that the proponents consider enterprise funding of a storm water district as part of the project to specifically fund storm water facilities. Enterprise funding for utilities is generally aimed at establishing a revenue stream for a specific utility that does not get absorbed back into the general fund and used for other government needs. Both the City of Boston through its Boston Water & Sewer Commission and Brookline through its Water and Sewer Division have established enterprise funds for water utility services. Both departments are responsible for maintaining water, sewer and storm drain facilities as part of their operating mandate. The Commission and Division raise revenue solely for the purposes of the operating and maintaining the water, sewer and storm drain facilities. DCR does not have as much control over its revenue sources to maintain their drainage facilities. The DCR will need to address this situation in the MOU to be signed among the parties. The Annual Update Report to MEPA is a vehicle to revisit the issue of enterprise accounts if funding of the storm water management program impacts the conduct of the program.

The purpose of the Annual Update is to inform the Secretary and the public on the process of project implementation and monitoring, as well as the effectiveness of mitigation and replanting. The annual update to MEPA is a crucial element of the BMP plan because it provides a method of reporting the implementation progress and effectiveness of the BMP plan to all parties of the MOU.

The major components of the BMP plan that will be addressed in the Annual Update to MEPA include results of water quality sampling program (sampled quarterly-reported annually); results of particle separator pilot study (initial year); results of catch basin cleaning program (Brookline, Boston and DCR, annually); and a general report addressing new BMPs that were implemented within the year and a measure of effectiveness.

7.6 Stormwater Management and Maintenance Plan

Management and maintenance of the entire stormwater system will be important to obtain the benefit of reducing sediment load and improving water quality in the Muddy River. Maintenance of the source and treatment control BMPs will be required to ensure that the target sediment goal is attained. Appendix C Stormwater Management and Maintenance Plan has been provided as a stand alone document for meeting the maintenance needs of the system. The table at the end of Appendix C summarizes the maintenance program by responsible entity. The table in Appendix C provides costs for new stormwater management initiatives and for those programs that are already part of the current operations notes that the costs are Already Carried. In the future it would be beneficial to break out current costs of the stormwater management programs as a baseline to understand the total costs to provide stormwater maintenance and management.

Table 7-3

Summary of Existing BMPs

<i>Best Management Practice (BMP)</i>	<i>Type of BMP</i>	<i>Location</i>	<i>Notes</i>
City of Boston Street Sweeping	Non-structural	City-wide	<p><i>Public Works Department – Highway Division</i></p> <p>17 contract sweepers in Public Works Districts, daily (Mon-Fri), April through November</p> <p>7 contract sweepers in various areas, nightly (Mon-Fri), year-round.</p> <p>1 contract sweeper on arterial routes, nightly (Mon-Fri), year round.</p> <p>7 contract sweepers in various areas, Sat. and Sun. nights, year round.</p> <p>6 City of Boston sweepers, city-wide, 7 days/week; year-round.</p> <p>1,500 curb miles of city streets cleaned weekly.</p> <p>75 "hand hokey" route cleaning personnel, highlight city area, 7 days/week.</p> <p>Approximately 110,000 cy of sediment removed from city streets per year.</p>
Catch Basin Maintenance Program	Non-structural	Various parts within the watershed	It is estimated that of the ~ 30,000 CBs in Boston, each CB is cleaned once every 3 years. The program includes inventory, mapping, and cleaning of catch basins to develop a maintenance program.
Storm Drain Maintenance Program	Non-structural	City-wide	BWSC performs maintenance as needed.
Illegal Sanitary Connections Remediation Program	Non-structural	City-wide	As of 2000, 712 illegal connections were corrected city-wide, 30 were within the Muddy River drainage area.
Site Plan Review Process	Non-structural	City-wide	Applications containing design plans and specifications for all proposed public and private connections to the sanitary or storm systems must be reviewed and approved by the BWSC. This prohibits illegal connections, requires BMP's on storm drain connections, and controls types of connections and discharges consistent with DEP stormwater standards.
	Non-structural	Various parts within the watershed	BWSC will inspect sites where it is reported that excessive sediment or other illegal discharges are occurring.

Table 7-3

Summary of Existing BMPs

<i>Best Management Practice (BMP)</i>	<i>Type of BMP</i>	<i>Location</i>	<i>Notes</i>
Receiving Water Monitoring	Non Structural	Dorchester, West Roxbury	The Design & Construction Division of the Boston Parks and Recreation Department (BPRD) is responsible for construction inspections on their properties. Sites are inspected on a weekly basis to ensure that sediment controls are in place. At the construction site, silt fences or hay bales are placed around existing catch basins.
Public Education	Non Structural	City-wide	
Household Hazardous Waste & Education Program	Non-structural	City-wide	BPRD is aware of oil leaking from a former Brookline Public Works building underground storage tank. During rainstorms, groundwater carries the oil toward Willow Pond and Leverett Pond.
Paint & Waste Oil Collection Program	Non-structural	City-wide	BWSC performs receiving water quality monitoring of Bussey Brook, Chandler Pond, and Canerbury Brook.
Catch Basin Stenciling Program	Non-structural	City-wide	Billing inserts are sent to residents several times a year. Stormwater information is also available on the BWSC's website.
Pet Waste	Non Structural	City-wide	PWD holds collection events; residents are notified by mail, newspaper & radio.
Stony Brook Improvement Project	Non-structural	Stony Brook drainage system	Collection centers, located in Roxbury, Hyde Park, Brighton & East Boston; open one Saturday per month from April through November.
Management of Public Open Space Maintenance Practices	Non-structural	City-wide	"Don't Dump" plaques are required on all new or rehabilitated catch basins and private owners are urged to do the same. Plaques are also installed when sidewalks are replaced.
Drainage Discharge Permits	Non-structural	City-wide	Animal Control Unit enforces pooper-scooper law on the city streets.
			Program to eliminate CSOs and illegal connections upstream, clean accumulated sediment from within the Stony Brook conduit and associated storm sewers and to repair stormwater control structures.
			BPRD: Integrated Pest Mgmt. (IPM) systematic decrease in pesticide/toxic product usages; only solid fertilizers used.
			BWSC requires discharge permits for non-stormwater discharges, such as dewatering drainage, to the drainage system.

Table 7-3

Summary of Existing BMPs

<i>Best Management Practice (BMP)</i>	<i>Type of BMP</i>	<i>Location</i>	<i>Notes</i>
Water Quality Controls for New Development	Possibly Both	Town-wide	Soil erosion & sediment control required on all plans submitted to Boston Conservation Commission; including all new development and construction projects under Wetland Protection Act; required to protect resources, new stormwater discharges proposed, BMPs must effectively remove 80 percent TSS as stipulated in the MSMP; maintenance & repairs exempt.
Particle Separators (Public)	Structural	Fenwood Road	An off-line separator on a 30" diameter storm drain with a tributary area of approximately 30 acres.
	Structural	Perkins Street & Parkman Drive	An off-line separator (Vortechs Stormwater Treatment System) was installed by the BPRD as part of the Historic Restoration of Jamaica Pond; the separator is maintained by BWSC.
	Structural	City-wide	BWSC evaluates the feasibility of installing stormwater BMPs when undertaking capital improvements to a drainage system.
Particle Separators (Private)	Structural	City-wide	BWSC requires privately owned and maintained particle separators on all new storm drains serving parking areas and/or other paved surfaces greater than 7,500 cu. ft. in size.
<i>Town of Brookline</i> Street sweeping	Non-structural	Town-wide	Streets within the main commercial areas (Harvard, Washington and Beacon Streets & adjacent side streets) are swept every evening with two Town-owned and operated sweepers; another machine is dedicated to the remainder to Town streets which are swept once a week; Route 9 annually swept by MHD; removal of accumulated sand is a priority in the spring; Town sweeping program is in compliance with the Consent Agreement.
Catch Basin (CB) Maintenance	Non-structural	Town-wide	Current CB maintenance included inspection & cleaning of arterial roadway CBs twice/yr & side streets once/yr; CB condition & sediment volume recorded on standard forms & entered into Town CB tracking database; current CB program is in compliance with the EPA Consent

Table 7-3
Summary of Existing BMPs

<i>Best Management Practice (BMP)</i>	<i>Type of BMP</i>	<i>Location</i>	<i>Notes</i>
Storm Drain Cleaning	Non-structural	Town-wide	Storm drain cleaning and/or television insp. conducted on case-by-case basis.
Construction Site Run-off	Non-structural	Unknown	DPW records indicates one active NPDES Permit (No. MAG 070010) issued to MWRA for dewatering during a construction project.
Water Quality Controls for New Development	Possibly Both	Town-wide	Soil erosion & sediment control required on all plans submitted to Brookline Conservation Commission; including all new development and construction projects under Wetland Protection Act; required to protect resources, new stormwater discharges proposed, BMPs must effectively remove 80 percent TSS as stipulated in the MSMP; maintenance & repairs exempt.
Illegal Sanitary Connections Remediation Program	Non-structural	Village Brook & Tannery Brook	Between 1990 – 1995, water quality monitoring revealed 20 illicit connections to sanitary sewers and most have been removed.
Illicit Connection Identification and Removal	Both	Village Brook & Tannery Brook	39 illicit connections detected and all connections were removed by December 1997.
	Structural	Longwood Avenue	Four homes were determined to be cross-connected to the Longwood Ave. storm drainage system; repair drainage pipes in poor condition as a result of TV inspections; plugged drainage pipe discovered in sewer manhole to prevent storm overflow of sanitary wastes; contamination is still evident and the Town is still investigating.
Household Waste Disposal	Non-structural	Town-wide	Weekly curbside collection & disposal by Arhter Scholfield Corp. (until 1999); 30 percent of solid waste stream recycled; in 1995 Town began replacing wire receptacles with solid receptacles; household hazardous waste collection day held twice/year, advertised through newspaper, flyers & cable TV; in 1994 Town published "Brookline Environmental Guidebook", free to residents, available at Town Hall; 3 stations in Town allow for waste oil drop-off.

database; current CB program is in compliance with the EPA Consent Agreement; Route 9 CBs cleaned once/yr by MHD; a routing network (line coverage) is being developed for CB cleaning that will link current CB database info; system would eventually be linked to the Town's GIS.

Storm drain cleaning and/or television insp. conducted on case-by-case basis.

DPW records indicates one active NPDES Permit (No. MAG 070010) issued to MWRA for dewatering during a construction project.

Soil erosion & sediment control required on all plans submitted to Brookline Conservation Commission; including all new development and construction projects under Wetland Protection Act; required to protect resources, new stormwater discharges proposed, BMPs must effectively remove 80 percent TSS as stipulated in the MSMP; maintenance & repairs exempt.

Between 1990 – 1995, water quality monitoring revealed 20 illicit connections to sanitary sewers and most have been removed.

39 illicit connections detected and all connections were removed by December 1997.

Four homes were determined to be cross-connected to the Longwood Ave. storm drainage system; repair drainage pipes in poor condition as a result of TV inspections; plugged drainage pipe discovered in sewer manhole to prevent storm overflow of sanitary wastes; contamination is still evident and the Town is still investigating.

Weekly curbside collection & disposal by Arhter Scholfield Corp. (until 1999); 30 percent of solid waste stream recycled; in 1995 Town began replacing wire receptacles with solid receptacles; household hazardous waste collection day held twice/year, advertised through newspaper, flyers & cable TV; in 1994 Town published "Brookline Environmental Guidebook", free to residents, available at Town Hall; 3 stations in Town allow for waste oil drop-off.

Table 7-3

Summary of Existing BMPs

<i>Best Management Practice (BMP)</i>	<i>Type of BMP</i>	<i>Location</i>	<i>Notes</i>
Catch Basin Stenciling Program	Non-structural	Town-wide	Town appropriates funds annually to carry out the program that is implemented by volunteers, and program is in compliance with Consent Agreement.
Municipal and Regulatory Authority	Non-structural	Various parts of the watershed	Brookline does not maintain a of list companies/industries with approved discharges (non-contact cooling, unpolluted process discharges) to storm drains and/or natural outlets approved by the Commissioner.
Consent Agreement	Non-structural	Village Brook, Tannery Brook & Longwood Avenue storm drain systems	Jan. 1995- Brookline enters into a Consent Agreement (CWA-2-1-95-1023) with EPA to address stormwater management practices; required to investigate and remove illicit connections in Village Brook, Tannery Brook & Longwood Avenue Drainage Areas in accordance with a definitive schedule; Agreement also required specific stormwater practices be implemented: increase average rate of street sweeping to twice per month; main streets in commercial areas increase sweeping to 3 times/week; increase rate of CB cleaning on main streets in commercial areas to twice/year (includes = 25 percent of town CBs); begin program to replace wire trash receptacles with solid; volunteer program for CB stenciling.
Particle Separators	Structural	Chestnut St. Drain/Willow Pond	There is a particle separator on the stormwater drainage system for the Chestnut Street Drain near Willow Pond; installed to intercept, hydrocarbons generated from a 1995 petrol. release at DPW. The separator is cleaned once 3 to 4 times per year.
Structural Water Quality Controls	Structural	Cypress and Franklin Streets	An 11,000 gallon Vortechs Stormwater Treatment System particle separator was installed in December 1999.
	Structural	Town-wide	With the exception of basins that contain a drop inlet, each catch basin in town is equipped with an oil/water separator.
	Structural	Riverdale Parkway	Open bottom (for infiltration) deep sump catch basins were installed along Riverdale Parkway as it was being reconstructed.
Metropolitan District Commission (MDC)			
Street Sweeping	Non-structural	Along the Muddy River	Goal of once per week.
Catch Basins	Non-structural	Along the Muddy River	CBs cleaned after grass season.

Table 7-3

Summary of Existing BMPs

Best Management Practice (BMP)	Type of BMP	Location	Notes
Roadway Patching	Structural	Leverett Pond	As needed.
Lawn Mowing	Non-structural	Bowker/Charlesgate, along fences	Every 10 days.
Turf Maintenance	Non-structural	Former Kelly Rink site	Every 12 days.
Leaf Removal	Non-structural	Bowker/Charlesgate, along fences, former Kelly Rink site	Aeration, overseeding and fertilization during spring/fall by Boston & Brookline bi-weekly weed control by Boston & Brookline; no maintenance by MDC.
Tree Planting/Pruning	Non-structural	Along the Muddy River	Performed during the spring and fall.
Rodent Control	Non-structural	Along the Muddy River	Planting during the spring, tree pruning once every five years.
Trash Barrels	Non-structural	Along the Muddy River	Rodent contract- June and as needed.
Litter Patrol	Non-structural	Along the Muddy River	Emptied daily during the summer, once every three days during the spring and fall.
	Non-structural	Along the Muddy River	Performed weekly.

Table 7-4

Summary of Recommended Source and Treatment Control BMPs

<i>Best Management Practice (BMP)</i>	<i>Responsibility</i>	<i>Type of BMP</i>	<i>Anticipated Source of Funds</i>	<i>Water Quality Problem Addressed</i>
Source Control BMPs				
Improve Street Sweeping Program	Boston PDW Brookline DPW MDC* BWSC	Non-structural Non-structural Non-structural Non-structural	Annual Operating Budget Annual Operating Budget Annual Operating Budget Annual Operating Budget	Reduces Discharge of Solids to River System Reduces Discharge of Solids to River System Reduces Discharge of Solids to River System Reduces Discharge of Solids to River System
Improve Catch Basin Cleaning/ Tracking Program				
Construction Site Controls	Brookline DPW DCR* BWSC	Non-structural Non-structural Non-structural	Annual Operating Budget Annual Operating Budget Annual Operating Budget	Reduces Discharge of Solids to River System Reduces Discharge of Solids to River System Reduces Discharge of Solids to River System
Annual Water Quality Sampling Program	Brookline DPW DCR* BWSC	Non-structural Non-structural Non-structural	Annual Operating Budget Annual Operating Budget Annual Operating Budget	Reduces Discharge of Solids to River System Reduces Discharge of Solids to River System Reduces Discharge of Solids to River System
Public Education Program	Administered centrally, shared cost	Non-structural	Annual Capital Budget	Monitors overall water quality improvement
Trail Maintenance and Desire Lines	Administered centrally, shared cost BPRD	Non-structural Non-structural	Annual Capital Budget Annual Capital Budget	Improves Public Participation in Preventing Litter, Pet Waste and Lawn Chemicals from Entering River System Reduces Discharge of Solids to River System
Roadway Drainage Waterfowl Control Program	Brookline POS DCR* DCR* BPRD	Non-structural Non-structural Structural Non-structural	Annual Capital Budget Annual Capital Budget Annual Capital Budget Annual Operating Budget	Reduces Discharge of Solids to River System Reduces Discharge of Solids to River System Reduces Discharge of Solids to River System Reduces Incidences of Waterfowl Pollution of River
Catch Basin Labeling Program	Brookline POS DCR*	Non-structural Non-structural	Annual Operating Budget Annual Capital Budget	Reduces Incidences of Waterfowl Pollution of River Reduces Incidences of Pollution Due to Dumping in Catch Basins
Improve Enforcement of Pooper Scoop Laws	BPRD Brookline POS	Non-structural Non-structural	Annual Operating Budget Annual Operating Budget	Improves Ability of Governing Entities to Enforce Bylaws Controlling Pollution Improves Ability of Governing Entities to Enforce Bylaws Controlling Pollution
Review and Strengthen Stormwater Regulations	Brookline DPW	Non-structural	Annual Operating Budget	Improves Ability of Governing Entities to Enforce Bylaws Controlling Pollution
Treatment Control BMPs				
Particle Separator Pilot Study and Basin BMP Evaluation	Administered centrally with shared cost	Non-structural	Annual Capital Budget	Reduces Discharge of Solids to River System
Bioretention at Heath School Parking Lot	Brookline DPW	Structural	Project Capital Program	Reduces Discharge of Solids to River System

Table 7-4
Summary of Recommended Source and Treatment Control BMPs

Best Management Practice (BMP)	Responsibility	Type of BMP	Anticipated Source of Funds	Water Quality Problem Addressed
Dry Swale at Dudley Triangle	Brookline DPW	Structural	Project Capital Program	Reduces Discharge of Solids to River System
Vegetated Swale in Victory Garden	Brookline DPW	Structural	Project Capital Program	Reduces Discharge of Solids to River System
Particle Separator at Emmauel College Drain	BWSC	Structural	Project Capital Program	Reduces Discharge of Solids to River System
Particle Separator For MDC Storm Drains	DCR*	Structural	Project Capital Program	Reduces Discharge of Solids to River System
Particle Separator at Daisy Field Drain	BWSC	Structural	Project Capital Program	Reduces Discharge of Solids to River System
Particle Separator at Chestnut Street Drain	Brookline DPW	Structural	Project Capital Program	Reduces Discharge of Solids to River System
Particle Separator at Jamaicaaway at Bynner Street	BWSC	Structural	Project Capital Program	Reduces Discharge of Solids to River System
Particle Separator at Calumet Street near Tremont Street	BWSC	Structural	Project Capital Program	Reduces Discharge of Solids to River System
Particle Separator at Pilgrim Road at Brookline Avenue	BWSC	Structural	Project Capital Program	Reduces Discharge of Solids to River System
Particle Separator at Colbourne Road at Ransom Road	BWSC	Structural	Project Capital Program	Reduces Discharge of Solids to River System
Particle Separator at Longwood Playground	Brookline DPW	Structural	Project Capital Program	Reduces Discharge of Solids to River System
Particle Separator at Kent Street and Brook Street	Brookline DPW	Structural	Project Capital Program	Reduces Discharge of Solids to River System
Particle Separator at Washington Street and Cypress Street	Brookline DPW	Structural	Project Capital Program	Reduces Discharge of Solids to River System
Particle Separator at Cameron Street	Brookline DPW	Structural	Project Capital Program	Reduces Discharge of Solids to River System
Particle Separator at Kendall Street and Prince Street	Brookline DPW	Structural	Project Capital Program	Reduces Discharge of Solids to River System
Particle Separator at Pond Avenue	Brookline DPW	Structural	Project Capital Program	Reduces Discharge of Solids to River System
Other Particle Separators	Determined as Located	Structural	Project Capital Program	Reduces Discharge of Solids to River System

Note: * DCR BMPs are Proponent Recommended Items for DCR

Table 7-9
Potential BMP Sites Evaluated

Site		Type of BMP	Land Use	Ownership	Identification for Further Evaluation or Reason for Rejection
Brookline	Olmstead Park - Willow Pond	Underground sand filter	HD Residential/Park	Public	Tree removal, maintenance disrupts historic park
Brookline	Mary Robinson Playground	Underground sand filter	MD Residential	Public	Active recreation area
Brookline	Reservoir Road Land	Wet pocket pond	MD Residential	Public	Utility conflict
Brookline	Waldstein Playground	Underground sand filter	HD Residential	Public	Trail relocation, isolation from public
Brookline	Cypress Street Playground	Underground sand filter	HD Residential/Commercial	Public	Active recreation area
Brookline	Sergeant Road, near Codman Road	Particle Separator		Public	Identified for further evaluation
Boston	Cleveland Circle Playground	Bioretention	Roadway	Public	Identified for further evaluation
DCR	Cleveland Circle Recreation	Off-line bioretention or swale	Park	Public	Active recreation area
Brookline	Driscoll School	Particle separator	School/Parking Lot	Public	Identified for further evaluation
Brookline	Harvard Street and Auburn Street	Particle separator		Public	Identified for further evaluation
Boston	Pilgrim Road at Brookline Avenue	Particle separator		Public	Identified for further evaluation
Brookline	Salisbury Road at Windsor Road	Particle separator		Public	Identified for further evaluation
Brookline	Tappan Street at Blake Road	Particle separator		Public	Identified for further evaluation
Brookline	Lawrence School	Particle separator	School/Parking Lot	Public	Identified for further evaluation
Boston	Jamaicaway at Bynner Street	Particle separator		Public	Identified for further evaluation
Boston	Calumet Street near Tremont Street	Particle separator		Public	Identified for further evaluation
Boston	Colbourne Road at Ransom Road	Particle separator		Public	Identified for further evaluation
Brookline	John Murphy Playground	Underground sand filter	HD Residential	Public	Active recreation area
Brookline	Dudley Triangle	Swale or Underground sand filter	MD Residential	Public	Identified for further evaluation
Brookline	Harry Downes Field	Off-line underground sand filter	HD Residential	Public	Identified for further evaluation
Brookline	Runkle School Playground	Bioretention	School/HD Res	Public	Active recreation area
Boston	Cleveland Circle Playground	Perimeter sand filter	Parking Lot	Public	Would require regrade of parking lot
Brookline	Olmstead Park - Leverett Pond	Dry Swale	Parking Lot/Park	Public	Disruption of historic park
Brookline	Newbury College Parking Lot	Bioretention/Dry swale	Parking Lot	Private	Private land
Brookline	850 Boylston St. Parking Lot	Perimeter Sand Filter	Parking Lot	Private	Private land
Brookline	Heath School Parking Lot	Bioretention	Parking Lot	Public	Identified for further evaluation
Brookline	Bolyston Street Playground	Off-line underground sand filter	HD Residential	Public	Identified for further evaluation
Brookline	Philbrick Square	Swale	MD Residential	Public	Park
Boston	Bread & Circus Parking Lot	Underground sand filter	Parking Lot/Bldg	Private	Private land
Brookline	Beacon St. (Wash. Sq)	Dry swale	Transp/Comm	Public	Utility conflict

Table 7-9
Potential BMP Sites Evaluated

	Site	Type of BMP	Land Use	Ownership	Identified for Further Evaluation or Reason for Rejection	
					Active recreation area	
Brookline	Driscoll School Playground	Off-line bioretention	HD Residential/ Commercial	Public		
Brookline	Newbury College Parking Lot	Bioretention/Dry swale	Parking Lot	Private	Private land	
Newton	Boston College Parking lot	Bioretention	Parking Lot	Private	Private land	
Brookline	Beacon St. (Wash. Sq)	Bioretention	Transp/Comm	Public	Utility conflict	
Brookline	Stop n Shop Parking lot	Bioretention - multiple	Parking Lot	Private	Private land	
Boston	MSPCA Parking Lot	Bioretention	Parking Lot	Private	Private land	
Brookline	Walgreens Parking Lot	Bioretention	Parking Lot	Private	Private land	
Boston	MSPCA Parking Lot	Bioretention	Parking Lot	Private	Private land	
Boston	Bread & Circus Parking Lot	Bioretention	Parking Lot	Private	Private land	
Brookline	Brookline Housing Authority	Bioretention	Parking Lot	Private	Private land	
Brookline	Brookline Housing Authority	Bioretention	Parking Lot	Public	Would require regrade of parking lot	
Brookline	Brookline Housing Authority	Bioretention	Parking Lot	Public	Utility conflict	
Brookline	Health Department Parking Lot	Bioretention	Parking Lot	Public	Would require regrade of parking lot	
Brookline	Town Hall Parking Lot	Bioretention	Parking Lot	Public	Utility conflict	
Brookline	Daniel Warren Field	Underground sand filter	Parking Lot	Public	Utility conflict	
Brookline	Daniel Warren Field Parking Lot	Bioretention/Dry swale	Parking Lot	Public	Size constraints	
Brookline	Beacon St. & Train Tracks	Perimeter sand filter	MD Residential	Public	Size constraints	
Brookline	Brookline HS Soccer Field	Off-line underground sand filter	Transp/Comm	Public	Size constraints	
Brookline	Brookline HS Soccer Field	Off-line underground sand filter	School/Field	Public	Active fields	
Brookline	Brookline HS Soccer Field	Off-line underground sand filter	School/Field	Public	Active fields	
Brookline	Leverett Pond Inlet	Forebay	Park	Public	Overdredge stream bed	
Brookline	Pond Ave. - Leverett Pond	Dry swale	Park	Public	Trees, fencing	
Brookline	Village Brook Drain - Leverett Pond	Forebay	Park	Public	Trees, fencing	
Brookline	Emerson Garden	Dry swale	Park	Public	Recreation land, utility conflict	
Brookline	Clark Park	Underground sand filter	Park	Public	Active park	
Brookline	Griggs Road	Off-line bioretention	Park	Public	Utility conflict	
Brookline	1626-1614 Beacon St.	Bioretention/Dry swale	HD Residential/ Commercial	Private	Private land	
Brookline	Beacon St. & Westbourne Terr.	Swale	HD Residential/ Commercial	Public	Utility conflict	
Boston	Emmanuel College	Particle separator		Public	Identified for further evaluation	
Boston	Daisy Field	Particle separator	Field	Public	Identified for further evaluation	
Brookline	Chestnut Street	Particle separator		Public	Identified for further evaluation	

Table 7-18

Estimated Source and Treatment Control BMP Costs

Best Management Practice (BMP)	Responsibility	Type of BMP	Initial Capital Program	Planning/ Capital Cost	Annual Cost
Source Control BMPs					
Improved Street Sweeping Program	Boston Brookline DCR	Non-structural		\$0 \$0 \$0	\$9,000 \$0 \$0
Institute Catch Basin Inspection and Cleaning Program	Boston Brookline DCR	Non-structural		\$30,000 \$10,000 \$40,000	\$25,000 \$10,000 \$6,500
Construction Site Controls	Boston Brookline DCR	Non-structural		\$0 \$0 \$0	\$10,800 \$3,600 \$0
Annual Water Quality Sampling Program	Boston Brookline DCR	Non-structural		\$0 \$0 \$0	\$19,000 \$50,000 \$6,000
Public Education Program	Boston Brookline DCR	Non-structural		\$20,000 \$20,000 \$0	\$1,500 \$3,000 \$500
Trail Maintenance and Desire Lines	Boston Brookline DCR	Non-structural		\$0 \$0 \$0	\$5,000 \$5,000 \$5,000
Roadway Drainage	Boston Brookline DCR	Structural		\$0 \$0 \$0	\$0 \$0 \$0
Waterfowl Control Program	Boston Brookline DCR	Non-structural	\$593,000	\$0 \$0 \$0	\$500 \$500 \$0
Catch Basin Labeling Program	Boston Brookline DCR	Non-structural		\$0 \$0 \$0	\$0 \$0 \$0
Improve Enforcement of Pooper Scooper Laws	Boston Brookline DCR	Non-structural		\$0 \$0 \$0	\$0 \$0 \$0
Review and Strengthen Stormwater Regulations	Boston	Non-structural		\$0	\$0

Table 7-18

Estimated Source and Treatment Control BMP Costs

Best Management Practice (BMP)	Responsibility	Type of BMP	Initial Capital Program	Planning/ Capital Cost	Annual Cost
Treatment Control BMPs					
Bioretention Area at Heath School Parking Lot	Brookline			\$0	\$0
Dry Swale at Dudley Triagle	DCR			\$0	\$0
Vegetated Swale in Victory Garden	Brookline	Structural	\$19,000	\$0	\$2,395
Particle Separators throughout watershed	Boston	Structural	\$53,000	\$0	\$4,045
	Administered centrally	Structural	\$112,000	\$5,000	\$4,340
	with shared cost	Structural	\$3,238,300	\$0	\$43,600
Particle Separator Pilot Study and Basin BMP Evaluation	Boston	Non-structural		\$65,000	\$0
	Brookline			\$60,000	\$0
	DCR			\$0	\$0
Particle Separator at Emmanuel College Drain	Boston	Structural	\$301,000	\$0	\$1,500
Particle Separator For DCR Storm Drains	DCR	Structural	\$301,000	\$0	\$1,500
Particle Separator at Daisy Field Drain	Boston	Structural	\$302,000	\$0	\$15,000
Particle Separator at Chestnut Street Drain	Brookline	Structural	\$323,000	\$0	\$1,600
Totals			\$5,242,300	\$250,000	\$229,880
Breakdown	Boston ¹		\$1,765,100	\$120,000	\$105,740
	Brookline ¹		\$2,583,200	\$90,000	\$109,640
	DCR		\$894,000	\$40,000	\$14,500

1. Breakdown of future particle separators is approximate only, final breakdown would depend on final locations.

8

Section Eight

Section 8

Maintenance and Management Structure

8.1 Introduction

Given the large number of stakeholders involved with the Muddy River project (as described in Section 2) and the project's multi-jurisdictional nature, and in light of the public and agency comments received, an effective organizational structure for maintenance and management that has broad support is key to the project's success. To that end, this section presents summaries of the following:

- The MEPA and other comments regarding the maintenance and management structure (Section 8.2) and
- The management structure and coordination outlined in the Muddy River Management and Maintenance Plan (Section 8.3).

The full text of the Management and Maintenance Plan is included on CD in Section 9.

8.2 MEPA Certificate and FEIR Comments

Originally, the MEPA Certificate on the FEIR required that the SFEIR present a more thorough discussion of the preferred project management structure as well as the potential alternative management structures. However, since the FEIR Certificate was issued, MEPA and the MMOC have concurred that an in-depth discussion of alternative management strategies is not required because the project proponents have agreed to implement the MMOC and are currently working on its organization.

The MEPA Certificate also required the SFEIR to include a Draft Memorandum of Agreement (MOA) specifying the following elements:

- Maintenance and management structure and roles and responsibilities of the various signatories;
- Enforceable performance standards (e.g., commitments to improved stewardship, historic preservation, and maintenance of parklands;
- Implementation and maintenance of Best Management Practices (BMPs);
- Coordination of maintenance activities across jurisdictions;
- Staffing commitments;
- Communication and dispute resolution plans; and
- Frequency of top level management meetings.

Similar comments were received from several non-governmental organizations including the Brookline Conservation Commission, Boston Greenspace Alliance, Brookline Greenspace Alliance, Charles River Watershed Association, Emerald Necklace CAC, ENC, and the MMOC as well as the Massachusetts Department of Environmental Management (now part of DCR).

8.3 Management Structure and Coordination

8.3.1 Muddy River Project Management Cabinet

Upon completion of the Phase I Muddy River Project, nearly \$100 million will have been spent from federal, state, local, and private sources on the Emerald Necklace's waterparks and related landscapes. In order to ensure that this level of investment is protected and preserved, a management structure for the project area and adjacent parks is being put in place.

Currently, no single organization manages the Muddy River park system. As a result, over time, the City of Boston, the Town of Brookline, and the Commonwealth of Massachusetts have developed differences with regard to management activities maintenance standards and resources, capital improvement projects, work methods, priorities, and technical solutions. In practice, these differences often manifest themselves as conflicts in user activities, path surfacing, landscape treatment, maintenance priorities, and the use of voluntary labor.

The goal of the Muddy River Maintenance and Management Plan is to create a new management structure that satisfies all parties and is consistent with a commitment to management, maintenance, and restoration. This structure includes the creation of a Muddy River Project Management Cabinet (Cabinet) that will include the following organizations:

- The Boston Parks Department,
- The Brookline Parks and Open Space Division,
- The Massachusetts DCR,
- The ENC, and
- The MMOC.

The Cabinet has been designed to ensure that the goals of the Muddy River project are met through cooperative management, accountability, and appropriate responsibility for long-term maintenance activities. The Cabinet will:

- Ensure unified quality performance standards for restoration and maintenance;
- Ensure seamless care of the parks system;
- Ensure effective completion of the Muddy River Restoration project;

- Protect and upkeep the significant public investment in the Emerald Necklace park system;
- Develop a workforce with the specialized expertise necessary to meet the unified quality standards to care for the historic and natural landscapes;
- Provide a safe, comfortable, and positive environment for the public throughout the system for all seasons;
- Ensure sufficient and consistent public funding streams; and
- Help to leverage significant private resources in support of the park system.

The structure of the Cabinet, as well as the regulatory and citizen groups and implementation team that report to it, are illustrated in Figure 8-1.

8.3.2 Regulatory Group

The Regulatory Group, which consists of the EOEA, the MEPA Unit within EOEA, the DEP, the Massachusetts Historical Commission (MHC), and other permitting agencies such as the City of Boston and Town of Brookline Conservation Commissions and Historical Commissions, reports directly to the Cabinet. The active participants of the Regulatory Group may vary depending on the permits and approvals applicable to each construction contract. The agencies are expected to carry out their responsibilities within their own current management and administrative framework following their own regulations, policies, and procedures. The Regulatory Group is responsible for ensuring compliance with applicable regulatory programs including the MEPA process, required permitting, and fulfillment of Section 61 Findings.

8.3.3 Advisory Group

The Advisory Group, which consists of the CAC and Technical Advisory Committee (TAC), also reports directly to the Cabinet. The CAC, whose members represent a diverse range of backgrounds, experience, and affiliation, was formed by the EOEA to provide public input on the full range of environmental issues both to the project proponents as they prepare MEPA submittals, and to the EOEA, as it reviews the submissions. The TAC's members possess considerable knowledge in all areas of importance to the project, principally federal, state, and local agencies with regulatory authority. The TAC is the forum for addressing detailed technical issues on project permitting, design, and implementation. The TAC also provides technical support to the Public/Private Partnership and Project Implementation Team.

8.3.4 Implementation Team

The Implementation Team, which also reports directly to the Cabinet, is further divided into two subgroups: Parkland Maintenance and Best Management Practices.

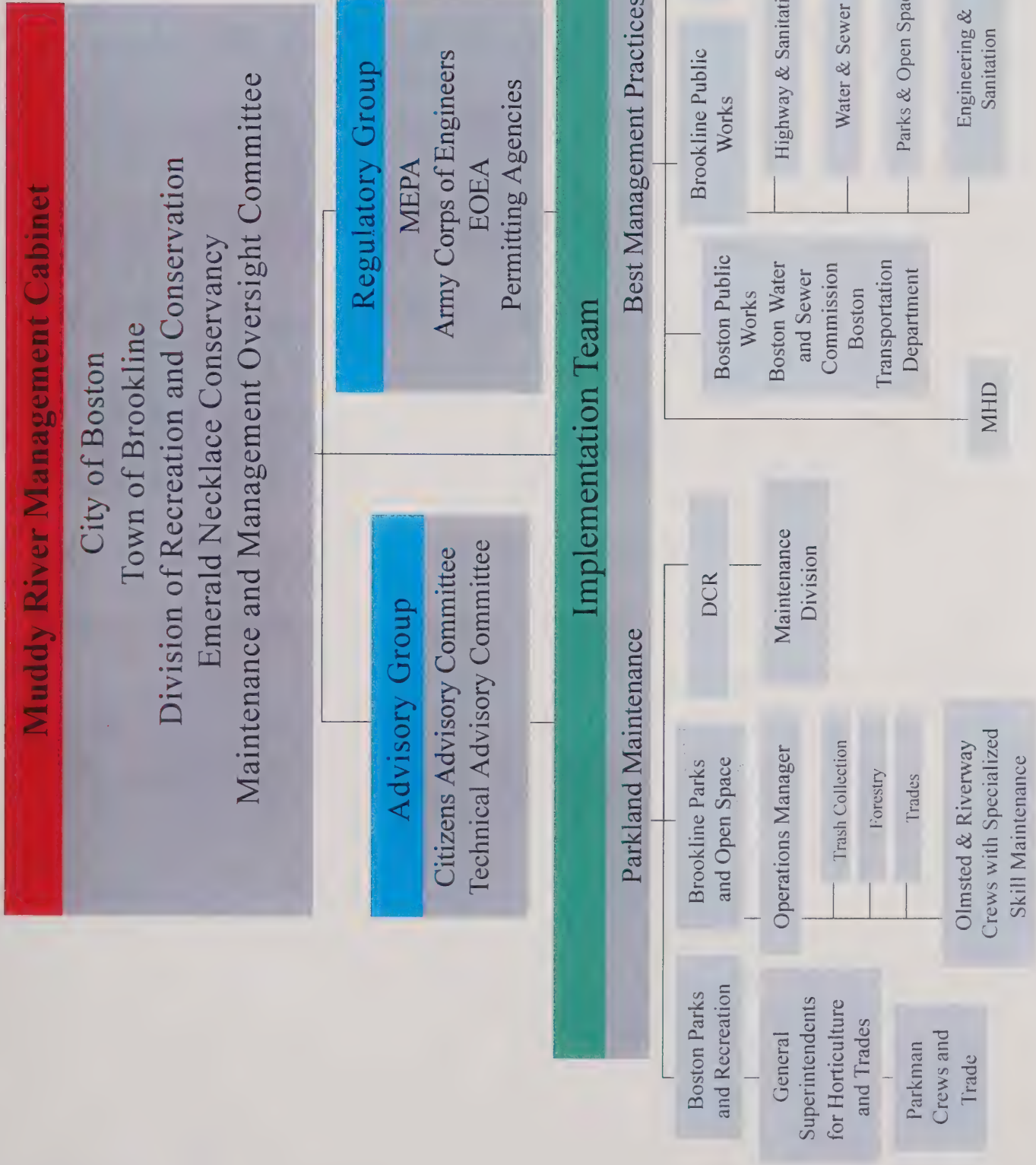


Figure 8-1

The Parkland Maintenance Subgroup consists of the Boston Parks Department, Brookline Parks and Open Space Division, and the DCR. As suggested by its title, the Parkland Maintenance Subgroup is responsible for the day to day maintenance of the parklands including horticulture, landscaping, forestry, and litter removal.

The Best Management Practices Subgroup is responsible for improvements outside the parkland areas that will be owned and conducted by outside parties such as the Boston Public Works Department, BWSC, DCR, Town of Brookline, Brookline Department of Public Works, the Massachusetts Turnpike Authority, and the Massachusetts Highway Department. The goal of the outside parkland work is that signatories to the 1999 Memorandum of Agreement (MOA) will meet their maintenance and implementation commitments and coordinate their activities through the Cabinet.

8.3.5 Muddy River Maintenance and Management Oversight Committee

The MMOC is an independent oversight body, established by the Secretary of the EOEa specifically for the Muddy River Restoration Project. All members of the Cabinet are represented on the MMOC. The MMOC also provides four seats for members of the CAC.

In order to ensure full protection of the significant public investment in the Project, and to serve as an innovative collaborative model for similar cross-jurisdictional projects, the MMOC:

- Provides ongoing independent evaluation of the Project, including management and maintenance;
- Facilitates close coordination and cooperation among Project partners; and
- Serves as the formal vehicle for public participation in all aspects of the Project, including its long-term management.

9

Section
Nine

Section 9

Maintenance and Management Plan

The Muddy River Restoration Project Maintenance and Management Plan originally published in January 2004 by the City of Boston Parks and Recreation Department and The Town of Brookline Parks and Open Space Division is contained herein on compact disk.

**THE MUDDY RIVER PARKS
OF THE
EMERALD NECKLACE**

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**THE MUDDY RIVER RESTORATION PROJECT
MAINTENANCE AND
MANAGEMENT PLAN**
January, 2005

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10

Section Ten

Section 10

Historic Resources

10.1 Introduction

As described in the DEIR and FEIR, one of the five goals of the Phase I project is historic preservation. The following actions were identified as necessary in achieving this goal:

- Remove invasive vegetation;
- Protect historic resources from damage due to construction;
- Preserve and rehabilitate the historic river bank configuration along the Muddy River, including restoration of the historic islands; and
- Plant vegetation in keeping with the historic landscape design, guided by the Emerald Necklace Master Plan.

10.2 MEPA Certificate and FEIR Comments

The MEPA Certificate on the FEIR had the following comments regarding historic resources:

- The SFEIR should contain enforceable commitments and a timetable for restoration and reopening of the Carlton Street Footbridge in its current location.
- The SFEIR should address ownership and use of an unauthorized “dirt bike park” adjacent to the Back Bay Yard.

In addition, MHC reiterated its comments on the DEIR, requesting more detailed plans, drawings, and technical information on culverts. A brief description of the construction plans was provided in the FEIR. MHC and other parties will be provided with more detailed information and plans showing the historical treatment of new and rehabilitated structures when available.

MHC also requested information regarding the pilot study for BMP implementation and maintenance as it becomes available. Additional information is provided in Section 7 of this SFEIR.

Finally, MHC requested an update on the plans for the Carlton Street Footbridge. Additional information is provided below.

10.3 Update on Carlton Street Footbridge

The Town of Brookline is proceeding with plans to restore the Carlton Street Footbridge (CSF). Brookline’s Engineering Division is taking overall responsibility for

the project, aided by consulting engineer Ammann & Whitney and a Design Review Committee (DRC) appointed by the Town.

Restoration plans have been developed and presented to the local Preservation Officer and MHC. During a meeting on September 29, 2004, MHC indicated its support of the DRC's design direction, including an accessible solution at the Longwood T-stop and handrail detailing. A memorandum describing that meeting, and providing other project updates, is found at the end of this section.

Ultimately, the Town plans to obtain funding for the CSF restoration through the Transportation Enhancements Program. Prior to submitting an application for funding, a number of steps must be completed, including obtaining: local letters of support, MBTA concurrence on the plans, an MHC Letter of Determination, and Massachusetts Architectural Access Board (MAAB) waiver approval.

The Town is targeting February 2005 for submittal of the Transportation Enhancements Program application. Review of the application by several entities (MAPC, Boston Metropolitan Planning Organization, Transportation Enhancement Steering Committee, Massachusetts Secretary of Transportation) is expected to take over a year (estimated March 2006). Assuming this schedule, and assuming a Transportation Enhancement Program award, the earliest case scenario is that the project could be programmed for final design in FY '07 and construction in FY '08.

10.4 Back Bay Yard

The restoration of the area behind Back Bay Yard has two distinct elements. Physical restoration and an educational program must occur together in order to change behavior and ensure the long-term success of this project. The work must also be tied closely to the larger project. This limits the period of disturbance of the park system and makes clear that the work is part of a larger restoration program throughout the system.

The woodland edge in this area of the park is a mix of oak, maple, robina and ailanthus. This mix of growth re-enforces the visual screen Olmsted created with the berm. While Back Bay Yard is in Boston, it is a small parcel at the entrance to the Brookline side of the park. Consistency of plant density and tree type will be important to create what John Charles Olmsted described as "landscape unity." Detailed historic planting plans, which exist for Brookline, do not exist for Boston so an accurate description of the historic condition is not available. The replanting shall consist of native plant materials from the Olmsted list, but, given its location on the Brookline side of the river, plant selection will also reflect records of Professor C. S. Sargent's focus on native, woodland material. This approach will be consistent with the vision J. C. Olmsted articulated for the Riverway in 1893, that it seems a valley of "natural growth slightly refined by art."

The area damaged by dirt bike use will be addressed as follows. A certified arborist shall perform an assessment of each tree that has roots in the area with altered

topography or where compaction seems severe. A planting plan will be developed consistent with the approach described above. Any tree in poor condition shall be removed. It is expected that many of the trees in the bowl will need to be removed, however this provides an opportunity to improve the soil condition through aeration and the addition of organic material. Trees to remain will be pruned by a certified arborist and appropriate steps will be taken to aerate soil. The property will be regraded to the configuration that existed prior to damage. The property will be replanted and mulched to retain moisture and stabilize the soil. Restoration is estimated to take about six months: assessment and design six weeks; advertising, bidding and awarding contract 12 weeks; construction eight weeks. Work will be timed to coincide with the start of construction at the former Sears Parking lot and adjacent headwall. Assuming that the USACE will start construction October 1, 2005, site assessment and design for the area adjacent to Back Bay Yard would begin mid-May 2005, advertise the contract July 1, and start construction October 1. The design, bid and construction period will be in concert with the USACE's schedule. The fence will be re-established along the property line and protective fencing will be put into place around the new plantings. Protective fencing will remain in place for a period of two years.

The educational program will be both on site, with signage explaining the restoration project, and off site with area students. The effort will target environmental and biking groups at area colleges and high schools. A presentation will be developed that both introduces the Muddy River project and details how misuse of the property by bikers damaged the park. We will offer to meet with groups at Brookline High School, Northeastern, Boston University and the high schools and Colleges of the Fenway. Care will be taken in developing the program to ensure that this work does not inadvertently start advertising the Back Bay Yard area as a dirt bike site to a whole new crop of young people. The MMOC staff has agreed to assist in developing the educational program. The goal will be to teach the students that activities that seem harmless can have significant consequences to a natural resource. While it will be important to have professionals plant larger trees, some smaller trees (or whips) could be planted by volunteers. This could provide an opportunity for those whose activities damaged the area to participate in its recovery. The educational program may also present an opportunity to develop a student volunteer group with the MMOC and Emerald Necklace Conservancy.



TOWN OF BROOKLINE
Massachusetts

**DEPARTMENT OF PUBLIC WORKS
ENGINEERING & TRANSPORTATION DIVISION**

October 14, 2004

A. Thomas DeMaio
Commissioner
Peter M. Ditto, PE
Director

MEMORANDUM

**TO: CARLTON STREET FOOTBRIDGE (CSF)
DESIGN REVIEW COMMITTEE (DRC)**

**FROM: BILL SMITH
PROJECT COORDINATOR**

**RE: CARLTON STREET FOOTBRIDGE
PROJECT UPDATE**

MSSG: Below please find SYNOPSES of footbridge initiatives since the Sept 9 CSF DRC mtg:

Massachusetts Historical Commission (MHC)

On September 29, representatives from Brookline's Engineering Division, along with the local Preservation Officer and consulting engineer Ammann & Whitney, met with Ann Lattinville, of the Massachusetts Historical Commission to review the footbridge plans and the proposed waiver application to the State's Access Board. In short, MHC is supportive of the DRC's design direction, including the accessible solution at the T-stop, and handrail detailing and would draft the requisite Letter of Determination that must accompany the Town's waiver application to the MAAB. MHC identified no adverse impacts, to the structure or the adjacent Olmsted landscape. MHC would ask that the Town provide a formal request letter and provide a draft MAAB application, reproducible plans, and letters of support from the CSF DRC, as well as the local preservation and disabled communities. In addition, a consent letter from the MBTA should be forwarded. Brookline Engineering will coordinate this effort.

Local Support Letters

Next steps require letters of support from the Brookline Preservation Commission, Commission for the Disabled and the CSF Design Review Committee. Brookline Engineering will work with these organizations to develop these letters.

MBTA Letter of Concurrence

Brookline Engineering and Ammann & Whitney have met with the MBTA twice to discuss the viability of providing an accessible solution at the Longwood T-stop, in compliance with ADA and MAAB regulations, and in conjunction with the restoration of the footbridge. Though MBTA design and operations sectors are supportive of this approach, and permission would be given to build such an accessible sequence, they express real concern that that in so constructing, perception and use would dictate that the actual platforms similarly be made accessible such that wheelchairs can use the new low floor trolley cars. This task would involve simply raising the entire platform (and shelters) approximately 8", providing asphalt surface pavers and a detectable warning edge along the tracks. This cost is not extreme and in fact, the greater cost, that of the design engineering and construction of stairs and ramps, would be born by the Brookline project. Though this station upgrade is not currently programmed by the MBTA, in a spirit of cooperation, the likely involvement of capital programming personnel and a bit of political suggestion (such as from the MBTA Advisory Committee and like, on which Brookline has a chair), this might be a joint and viable project in future. The benefits would be demonstrably shared. A real construction timetable is several years out, considering the grant program to which the Town will be applying. Ammann & Whitney, together

with Brookline Engineering, will craft a letter to, and facilitate an answer from, the appropriate MBTA division – a significant document that must accompany the DRC plans.

Massachusetts Architectural Access Board (MAAB)

The waiver application to the MAAB will be drafted by Brookline Engineering. Necessary support documentation, such as the proposed plans, alternatives explored and cost estimates, will be supplied by Ammann & Whitney. Local letters of support will be included, along with a consent letter from the MBTA. The MHC Letter of Determination is sent directly by this state agency but should be coordinated in terms of timing with the Town's submission. The MAAB will evaluate the application request and either rule directly or schedule a hearing for the project. Brookline Engineering will serve as the contact locally.

Transportation Enhancements Program

Applications for this funding program are accepted on a revolving basis, at quarterly deadlines throughout the year. The next deadline for this program is Nov 3. Based upon tasks that must be concluded prior to submitting, specifically local letters, the MBTA concurrence, the MHC Letter of Determination, and the MAAB finding, as well as the actual Enhancements application and the couple local public process meetings, achieving this date appears unrealistic. Brookline Engineering is committed to proceeding with the direction set forth by Town Meeting and would propose, depending the MAAB outcome, that the subsequent quarter in the first week of February be a more tangible target.

Public Process Schedule

While a couple dates (Oct 13 or 14) were set as placeholders at the Sept 9 CSF DRC meeting, pending the outcome of the then upcoming meeting with the Massachusetts Historical Commission, these meeting dates proved not to be needed in order to move ahead, due to MHC's clear support without change. The next meeting of the DRC, as discussed at the last meeting, will be scheduled after the MAAB decision and before a Selectmen's Public Hearing on the footbridge design process and sign-off on the Enhancements application. The agenda for this meeting and the precise date will depend wholly on forthcoming interaction with this state agency responsible for all accessibility issues statewide. Brookline Engineering will strive to keep the DRC apprised of footbridge developments. In addition, DRC members should see circulated for comment in the next week a letter of support, addressed jointly to the MHC and MAAB, for signature by the Chair.

11

Section Eleven

Section 11

Rare Species

11.1 Introduction

The only verifiable rare species identified in the project area is the state-listed threatened Threespine Stickleback (*Gasterosteus aculeatus*) (Figure 11-1). This unique fish species is found in Spring Pond (the only remaining one of Olmsted's natural history pools), its outlet stream, and a small area at the inlet of Willow Pond from Spring Pond. In Massachusetts, Threespine Sticklebacks are found along the coast in estuaries, salt marshes, and tidal creeks. The only known trimorphic, landlocked population in Massachusetts is that in Olmsted Park. It is possible that this population was introduced by members of the Boston Society of Natural History as part of a never-completed natural history museum complex proposed by Fredrick Law Olmsted. Due to their limited range in the urban park habitat, these fish are susceptible to extirpation (Hartel, Halliwell and Launer (Inland Fishes of Massachusetts, Mass. Audubon Society, 2002, pp 223-225)). It is anticipated that the habitat improvements and restoration by this project will enhance the ultimate survivability of the Threespine Stickleback population in the Emerald Necklace.

A state endangered bird species, the Pied-billed Grebe (*Podilymbus podiceps*), has been observed in the area. However, because of the lack of suitable habitat, it is likely that the Pied-billed Grebe is only an occasional visitor to the Emerald Necklace. It has been concluded by the Massachusetts Natural Heritage & Endangered Species Program (MNHESP) that the Pied-billed Grebe will not be negatively impacted by the proposed project.

11.2 MEPA Certificate and FEIR Comments

Comment letters on the rare species habitat sections of the FEIR have been received from the public and referenced in the MEPA Certificate on the FEIR. The MEPA Certificate requests that this SFEIR include additional rare species mitigation if plans for work in areas that provide habitat for rare species change as a result of the additional analysis required elsewhere in the MEPA Certificate.

Other comments received from the public on the rare species habitat sections of the FEIR included the following:

- The following change to the "Survey and Capture Protocols" is recommended: to avoid killing sticklebacks, the water temperature in the transfer buckets must be equalized with water in the temporary holding pond prior to releasing the captured fish.
- The comment letter from the Division of Fisheries and Wildlife should be used as a guide for fish and wildlife resources.



- The means of collecting fish and other aquatic life, including reptiles and amphibians, using electroshock equipment prior to dredging should be included in Table 10-1 of the Section 61 Finding under "Fish and Benthic Resources."

The only change to the work proposed adjacent to stickleback habitat is the addition of Kelly Rink as a staging area. Because of the proximity of the rink to Spring and Willow Ponds (approximately 40 feet downstream), additional site drainage controls will be implemented to divert all site drainage away from the ponds. These additional measures are reflected in the mitigation plan for the stickleback described later in this section.

Other comments are addressed as appropriate in this section and in Section 13.

11.3 Natural History of the Threatened Threespine Stickleback

The Stickleback Family (*Gasterosteidae*) has been observed throughout the Northeast in marine, brackish and inland fresh waters. Typically, fish within this Family are small, seldom larger than three inches, with a maximum of four inches, total length (TL).

The *Gasterosteidae* are easily distinguished from other fish by the presence of dorsal (back) spines, which number two, three, four, seven or more, depending upon the particular genus. Some of these variants have bony plates in their scaleless skin, while others lack these plates altogether. The relative "strength" of this dermal armature appears to be dependent upon the ecology of their habitat, strong in saline and weak in fresh water.

A trimorphic freshwater population of Threespine Sticklebacks (*Gasterosteus aculeatus*) is listed as a State Threatened Species by the MNHESP.

The Threespine Sticklebacks, like those in Olmsted Park, exist on a varied diet of small aquatic invertebrates (copepods, isopods), fish eggs, fish larvae, mollusks and aquatic plants. Sticklebacks are not only omnivorous but voracious (Bigelow and Schroeder, *Fishes of the Gulf of Maine*, DOI, Fish and Wildlife Service, 1953, pp 307-331).

The male Threespine Stickleback's coloring normally ranges from deep gray, or olive, on the bottom and green-brown dorsally. The male's sides are silvery and reflective. As spawning draws near, the male's appearance darkens, developing a reddish color from the nose to the vent and often up the sides. The eyes turn a vivid shade of light blue. During spawning, the female Stickleback also turns reddish with a brownish back which exhibits transverse bands. The female's sides take on a brassy reflectiveness not seen the rest of the year.

Concurrent with the color changes, a distinct breeding behavior pattern is initiated by the male. He undertakes the building of small, barrel-shaped nests, in a sheltered locale in shallow water (i.e. the shallow shelf at the inlet of Willow Pond where the waters of Spring Pond inflow). The nest is typically constructed of pieces of grass, aquatic weeds and other vegetation, cemented together with mucous filaments and weighted down with pebbles. The males compete with each other in luring the females to the nest by a showy zigzag courtship display. One, or a succession of females, deposit up to 150 eggs per nest, which may contain up to 600 eggs overall. The male then enters the nest to fertilize the eggs, which stick in a clump to each other and to the nest itself (Bigelow and Schroeder, 1953).

Incubation occurs within a six to ten day duration. During this period, the male Stickleback guards the nest driving away any and all intruders. As the hatching time approaches, the male tears down the nest but continues to guard the fry until they absorb their yolk sacs and become independent. While the young fry are only 4.25 or 4.5 mm in length when hatched, they begin to take on adult characteristics and form, with developed fins and spines when they are six weeks in age.

The life span of the Threespine Stickleback varies between populations and habitat. Some live for only one year, others up to three-and-one-half (3.5) years. Many adult males die shortly after spawning.

Karsten E. Hartel, Curator Associate in Ichthyology at the Museum of Comparative Zoology at Harvard University, believes that two unique populations, or morphs, are present in Spring and Willow Ponds. Aside from the variation in distinct lateral plates, individual morphs represent only the fourth record of low plate individuals in eastern North America and the southern most completely freshwater (landlocked) observation. Further, it is possible that this population was introduced into the "natural history pools" by Olmsted as part of a natural history museum complex he and the Boston Society of Natural History had planned, but never fully realized. Spring Pond is the only remaining evidence that Olmsted's plans for a series of natural history pools was at least partially realized.

Hartel has found that the fish in the Willow Pond population are larger (possibly a different morph) than the Spring Pond population. This may or may not be due to larger foraging and nesting areas with abundant food supply and greater space in Willow Pond. The Threespine Sticklebacks in Spring Pond grow only to about one-and-one-half (1.5 in TL) inches while those adults collected from the inlet of Willow Pond appear to grow to two-and-one-half (2.5 in TL) inches in length. This condition may be due to how fish respond to their aquatic environment, which is dependent upon the aerial extent and suitability of their habitat. The larger size of individuals of one population as compared to the other may be the result of long-term adaptation to the differing habitat conditions found in each pond.

Because two sub-populations or morphs have evolved, a separate temporary holding pool will be used during construction, as described later in this section, rather than

relocation of the individuals from Willow Pond up into Spring Pond during construction as originally proposed in the DEIR. A separate temporary pool will keep the two populations separate.

11.4 Data from Previous Surveys

The results of the survey for the Threespine Stickleback that was conducted as part of the DEIR are provided in Section 4.6.2.3 of that document.

The Threespine Stickleback was found in Spring Pond as well as in a small pool that is immediately below the small dam between Spring Pond and Willow Pond. The fish in Spring Pond and the pool were observed visually and later confirmed by electro-shocking. The electro-shocking was conducted as a survey for representative fish along the various segments of the entire Muddy River Project area. Although electro-shocking temporarily stuns the fish and usually allows the fish to return to a conscious state, it can kill individuals that are subjected to too much current for their condition. The fish surveys along the Muddy River were not intended to generate population-specific data, only to establish which species were present. Rather than risk harming Sticklebacks, there is no need to conduct any electro-shocking in the future as long as other collection techniques (i.e. seining or minnow traps) are available.

11.5 Overview of the Proposed Environmental Enhancement Work at Spring and Willow Ponds

The Threespine Stickleback inhabits Spring Pond which is a small tributary to Willow Pond. Spring Pond flows into a small brook (approximately 150 feet long) that passes under a pathway and enters Willow Pond. A one and one-half to two foot high stone spillway that is in need of repair, separates the brook from Spring Pond from Willow Pond. Spring Pond is kept considerably cooler than Willow Pond by the discharge of groundwater into the Spring Pond.

During the preparation of the DEIR, the proposed project elements at Willow Pond were discussed with the MNHESP staff and reviewed in the field. Through these and other efforts, opportunities were observed where the habitat conditions for the Threespine Stickleback can be protected, as well as possibly, enhanced.

The MNHESP, the DEP, Boston Conservation Commission, and others requested that the details of a habitat protection, mitigation and enhancement effort be provided. The protection, mitigation, and enhancement effort will be conducted for the proponents by a qualified fisheries biologist (and it is anticipated that a similar plan would be followed by the USACE). This plan includes:

- The capture of Threespine Sticklebacks that are inhabiting the inlet to Willow Pond below the Spring Pond dam and relocating them to a temporary holding pool (constructed 12 months in advance). See Sections 11.6 through 11.8 for more information;

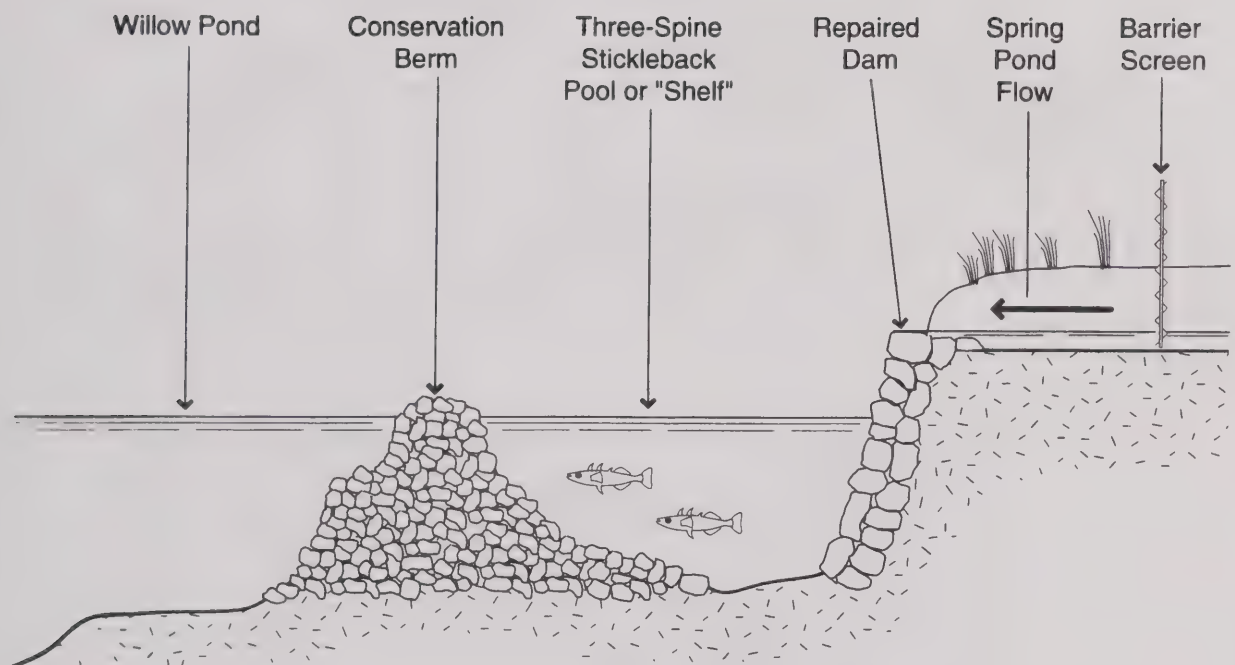
- The restoration of the historic Willow Pond capacity by the dredging and removal accumulated and contaminated sediment;
- The removal of invasive vegetation around Willow Pond;
- The rehabilitation of the stone spillway between Willow Pond and the brook leading from Spring Pond;
- Preservation of the shelf habitat of the Threespine Stickleback in Willow Pond;
- Addition of a small gravel berm at the edge of the shelf habitat to define the outer edge of the Stickleback pool in Willow Pond and to serve as a barrier to predation;
- Repair and modification of the water level controlling discharge pipe in Willow Pond;
- The control of sediments and nutrients entering Spring Pond from the adjacent bank and pathways;
- The creation of the small pool or forebay above Spring Pond, including water cress and shade plantings, for Sticklebacks which are temporarily relocated from Willow Pond;
- The preservation of the historic park features at Willow Pond by the revegetation of the new bank, the reintroduction of an island in Willow Pond, and the establishment of wetland areas and the restoration of terrestrial habitat with indigenous plantings;
- The repair or replacement of worn pathways and denuded ground.

The relative locations of each of these tasks are shown on Figures 11-2 and 11-3. Project objectives met by the above construction activities are summarized on Table 11-1. Four of the activities address three or more of the project objectives.

11.6 Details of Environmental Enhancement and Mitigation

Details of the environmental mitigation work are presented below. Again, it is anticipated that similar activities would be performed by the USACE.

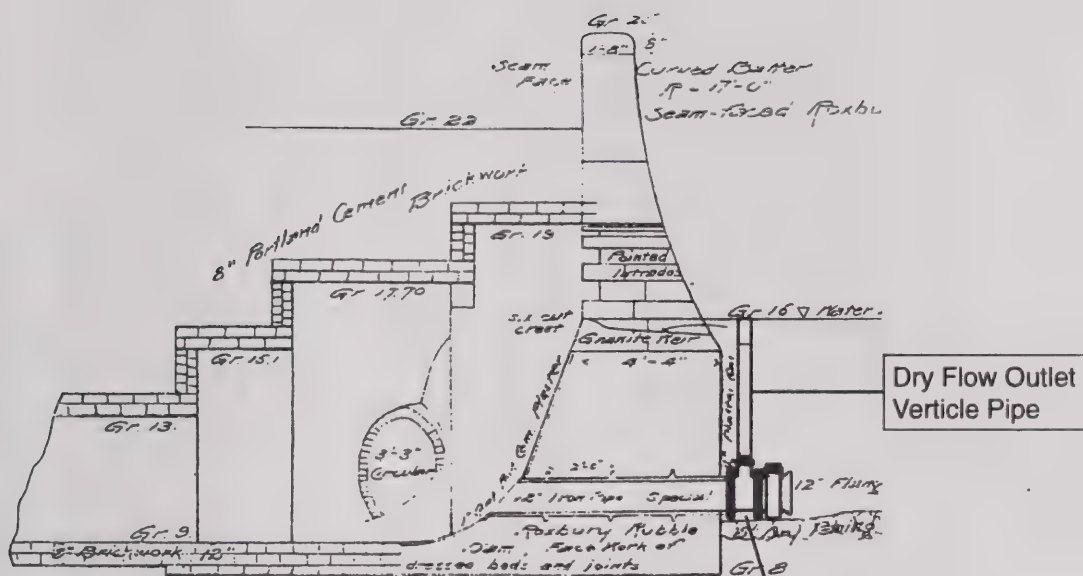
1. Invasive vegetation at Willow Pond will be removed from the buffer zone and other contiguous areas under the direction of the landscape architect.
2. The repair of eroded banks along the former MDC skating rink will be accomplished. There are a number of locations along the former MDC Kelly Rink where paths cut across from the rink area and down the steep embankment. There are also some random pathways (desire lines) through the trees in this area. This has caused erosion directly into Spring Pond. To control this there are several tasks that need to be accomplished:



Threespine Stickleback
Gasterosteus aculeatus Linnaeus 1758

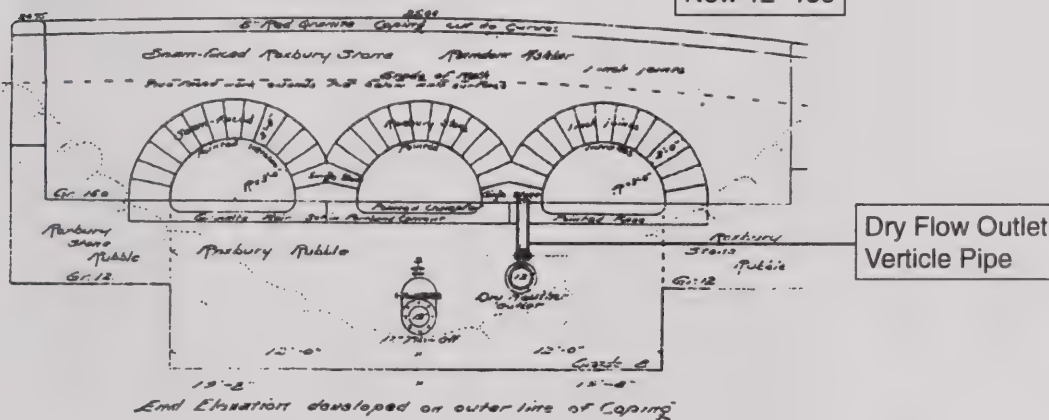
(Source: Hartel, et.al.)

Figure 11-2
Proposed Mitigation at Willow Pond
Habitat Enhancement



Longitudinal Section on Axis Line

A.H. French, Eng.



Not to Scale

Figure 11-3
Proposed Dry Flow Outlet at Willow Pond

TABLE 11-1
PROJECT OBJECTIVES MET BY WILLOW POND PROJECT ELEMENTS

	PROVIDE FLOOD CONTROL	IMPROVE WATER QUALITY	ENHANCE AQUATIC & RIPARIAN HABITAT	REHABILITATE LANDSCAPE & HISTORIC RESOURCES	INSTITUTE BEST MANAGEMENT PRACTICES
Dredge approximately 5,900 CY of sediment	None	Removing sediments will improve water quality in pond	Removing sediments will improve bottom habitat and improve water quality	Restores historic capacity and shape of pond	None
Re-vegetate disturbed bank areas and establish wetland areas	None	Reduces erosion from unvegetated areas	Results in more diverse aquatic and riparian habitat	Rehabilitates landscape treatment from Olmsted plant list	Reduces erosion from unvegetated areas
Rehabilitate historic island	None	None	Results in more diverse aquatic and riparian habitat	Rehabilitates historic feature of Olmsted park	None
Enhancement of three spine stickleback habitat and rock dam outlet of Spring Pond		Slightly improves water quality in Babbling Brook tributary	Results in improved aquatic habitat for three spine stickleback	Restores one of the historic pool areas in Olmsted Park	None
Repair / replace pathways and re-vegetate desire lines and unplanted areas	None	Reduces erosion from unvegetated areas	Results in more diverse aquatic and riparian habitat	Rehabilitates landscape treatment from Olmsted plant list	Reduces erosion from unvegetated areas

- The eroded pathways will be stabilized with vegetation and stone dust to mitigate erosion and transport of sediment to Spring Pond.
 - At the upper end of Spring Pond there is an accumulation of sand/gravel (see Figure 11-1) that has been scoured from the adjacent wetland by high energy storm flow from a surcharged BWSC manhole at Brynner Street. During preparation of the DEIR this matter was called to the attention of the BWSC, and they responded by cleaning the main drainage line from the area adjacent to Brynner Street and toward the Daisy field outlet to Leverett Pond. According to BWSC, this should have eliminated all flows from discharging into Spring Pond.
3. In relation to the problems that have been caused by runoff discharging into the wetland and flowing into Spring Pond, the following needs to be accomplished:
- The wetland upstream of Spring Pond will be cleaned of trash and debris by hand.
 - A shallow settling area will be excavated adjacent to the wetland upstream of Spring Pond where scouring has already damaged the habitat. However, the settling area is not intended to be contiguous with Spring Pond. It will be located approximately 5.5 feet south of the pond. An area of coarse stone will surround and separate the settling area and the wetlands. Whereas this basin will be constructed off-line, the intermittent stream will need to be redirected through this basin. During construction of the settling area, Spring Pond water quality will be protected by specific soil and erosion control procedures.
4. Revegetation will occur in damaged areas as well as at locations where the buffer zone habitat needs enhancing around Willow Pond. This includes the planting of thick stands of bushes and shade trees. Revegetation of the buffer zone will be conducted in accordance with the Pressley Associates plans (see Figure 11-2). The planting plan includes dense areas of vegetation to discourage human and animal intrusion as well as an Olmsted "beach" on the Brookline side. The restored island will be densely revegetated.
5. Nutrient loading in Spring and Willow Ponds may originate from several sources such as: road run-off, fertilizers, and waterfowl and dog excrement. Restoration of the banks will reduce runoff to the ponds. The BPRD will refrain from using fertilizers or herbicides in the area adjacent to the ponds, signage will be located to discourage feeding of waterfowl (Canadian Geese and ducks), and use of pooper-scoopers by dog walkers will be encouraged.

11.7 Plan for Protection of Rare Species during Construction

It was originally proposed to relocate the Willow Pond Stickleback population to Spring Pond to avoid impacts to that population during dredging operations. Dr. Hartel recommended against this original plan. This is due to a concern that co-

mingling the two different populations may have a negative impact due to foraging and territorial competition in the smaller pool as well as unknown interbreeding impacts between the two populations. Furthermore, relocation of individual populations is discouraged by DWW Policy 90-2 to the Wetlands Protection Act.

An alternative plan is proposed that provides for capture of the Willow Pond Sticklebacks as previously proposed, placing them in a new, temporary holding pool (the site of the planned settling area upstream of Spring Pond) until dredging operations in Willow Pond have been completed, and then returning the fish to their original habitat in Willow Pond. Under this alternative there is no adverse impact to the Spring Pond Sticklebacks, and minimal impact to the Willow Pond population.

It is proposed that the temporary holding pool be created by excavation of an area upstream of Spring Pond in the location of the settling area. Sizing the holding pool will be determined during the design period. This holding pool will have a sand bottom. Bordering vegetation will be planted, leaves and sticks can be placed in the pool to provide sheltering and "nesting" conditions for the Threespine Stickleback. Source water for the pool will be from the same spring system that supplies Spring Pond. It is believed that the cool spring water is what has sustained the Stickleback population in the Spring and Willow Ponds. This holding pool will be protected from upstream siltation by hay bales and silt screens, as appropriate. This pool will be created after the WPA permit approval is granted to allow time (about one year) for water quality stabilization and the establishment of a benthic and small invertebrate population prior to introduction of the Sticklebacks.

Upon completion of construction in Willow Pond, the Sticklebacks will be returned to their original habitat and the temporary pool will be allowed to remain, serving as a settling area to Spring Pond for long-term protection of Spring Pond from upstream siltation.

11.8 Survey and Capture Protocols

The goal of this work is to conduct the necessary improvements to the environmental features in and around Willow Pond with no, or at best minimal, disturbance to the threatened species.

Because of the proximity of the Kelly Rink, which is proposed as a staging area, to Spring and Willow Ponds (the ponds are approximately 40 feet downstream), additional site drainage controls will be implemented to divert all site drainage away from the ponds.

To implement that portion of the mitigation plan that pertains directly to the Stickleback, the following protocol for capturing and temporarily relocating the Threespine Sticklebacks will be required in the order in which the item is listed:

1. Place a V-notch weir as close to the outlet from Spring Pond and its dam as possible (see Figure 11-2). The invert of the V-notch should be no lower than the

present water elevation. This will prevent the unnecessary loss of water from Spring Pond and the lowering of the shallow water depth of Spring Pond. There cannot be any lowering of Spring Pond because the water body is already very shallow with years of accumulated sediment and leaves and debris.

2. Immediately upstream of the V-notch weir, install two screens across the outlet (see Figure 11-2). Their purpose is to keep Sticklebacks from swimming out of Spring Pond and into the construction area. One screen will consist of one-inch mesh and the second screen, closest to the weir, will be 0.25-inch mesh. These screens must be maintained during construction because algae and leaves, etc., will accumulate behind them leading to clogging. The screens will be removed after construction activities are complete.
3. Using seines, nets and/or minnow traps, the Sticklebacks in the small embayment in Willow Pond will be captured and moved to the temporary holding pool above Spring Pond. Once the fish are netted they will be placed in a five-gallon bucket of water from Spring Pond (water temperature in bucket and release pool will be equalized). Without delay, the captured fish will be moved to the pool above Spring Pond and released.
4. Once it is determined that most, if not all, Sticklebacks have been captured and moved to the pool, the capture and related efforts will conclude and the reconstruction of the Spring Pond Dam and dredging of Willow Pond can commence.
5. The repairs to the Spring Pond dam include the replacement of stone that have fallen from the dam spillway and face.

11.9 Project Timing

The timing and duration of the project elements will be determined by funding availability and environmental constraints such as spawning period. However, it is currently anticipated that construction activities will take place subsequent to final design..

Actions to protect the Threespine Stickleback and its habitat will necessarily be scheduled prior to any dredging or related construction activities in Willow Pond. Capture of Threespine Stickleback in Willow Pond for temporary holding prior to return to their original habitat in Willow Pond will be scheduled around (to avoid) the Threespine Stickleback spawning period, May to July. The consultant fisheries biologist together with the Independent Environmental Monitor will determine whether or not nest building has commenced.

11.10 Environmental Monitoring and Maintenance

Project management and maintenance is addressed in Section 9 of the SFEIR. That plan provides for quarterly water quality sampling to be collected during a dry period (no rainfall in the past 96 hours), during precipitation, and the day following a precipitation event. The rationale behind this frequency of sampling is to obtain seasonal data preceding precipitation (rain or snow), and to monitor the impact to

water quality during and after an event. Therefore, in any given year, up to 12 sampling events will occur at each sampling location.

During each quarter, water quality samples will include:

<i>Sample Parameters</i>	
Fecal Coliform Bacteria	Turbidity
Fecal Streptococcus Coliform Bacteria	Alkalinity
Total Suspended Solids (TSS)	Acidity
True and Apparent Color	Ammonia Nitrogen
Total Phosphorus	Nitrate-Nitrite Nitrogen
Orthophosphate Phosphorus	Metals
pH	TPH-EPH
Temperature	
Dissolved Oxygen	

During the one year stabilization and “acclimatization” period and the subsequent temporary “holding” period prior to relocation of the Willow Pond fish, the Threespine Stickleback holding pool located upstream of Spring Pond will also be sampled quarterly. Physical inspection of the holding pool during the acclimatization period will be monthly by the consulting fisheries biologist and reported to the Independent Environmental Monitor.

In the Threespine Stickleback habitat areas in Willow Pond, Spring Pond and the temporary holding pool (the eventual Spring Pond sediment control settling area), a special plan is required to monitor and maintain the viability of the fish during the construction period. The Independent Environmental Monitor will be specified to undertake:

1. Review monthly reporting of the consulting fisheries biologist during stabilization and acclimatization of the holding pool, inspect the pool for development as a suitable Stickleback habitat in respect to food supply, shelter, substrate and water quality.
2. Oversee the capture and transfer of Willow Pond Sticklebacks to the temporary holding pool.
3. On a biweekly basis following relocation, inspect by observation the holding pool population for mortalities and viability of the population and initiate any appropriate remedial actions as deemed necessary.
4. On a bi-weekly basis in concert with item 3 above, inspect the viability of the Spring Pond Stickleback population.
5. Screens in the holding pool outlet will be inspected and cleaned as necessary on a bi-weekly cycle by the contractor.
6. The holding pool and its outlet, and Spring Pond and outlet will be inspected and cleaned of any urban debris on a quarterly cycle.

7. Any Stickleback mortalities observed in any of the above areas are to be reported to the MNHESP office.
8. During construction in Willow Pond, on a bi-weekly basis inspect the shelf area in Willow Pond for viability of any remaining stickleback population and for any impact to the shelf area habitat due to the construction activities.
9. Oversee reconstruction of the Willow Pond berm at the inlet.
10. Oversee the return of the holding pool population to Willow Pond.
11. Using seines and/or minnow traps, continue to monitor on a quarterly basis the viability of the Stickleback populations in both Willow and Spring Ponds for at least two years after the fish are returned to Willow Pond.

The Independent Environmental Monitor will submit monthly reports to the project management structure described in Section 9 of the FEIR and will recommend any immediate remedial actions as they may be required. These reports will be summarized in the annual report.

Maintenance programs in the project area for culverts, water quality, BMPs and habitats are also discussed in Section 9. In addition to maintenance functions described in that section, the following maintenance tasks will be required for long term, post-construction monitoring:

1. The integrity of the banks around the above locations will be inspected and reported in the Annual Update, as long as Annual Updates are required;
2. The condition of the shelf area and the berm at the inlet to Willow Pond will be inspected annually.

11.11 Permittability of Rare Species Impacts under the Wetlands Protection Act

The MNHESP has determined that the proposed mitigation project will not constitute a "taking" of the Threespine Stickleback (letter from Patricia Huckery, MNHESP to Secretary Bob Durand, Massachusetts Division of Fisheries & Wildlife, dated 27 February, 2002). Therefore, the project will not require a Conservation Permit in accordance with the provisions of the Massachusetts Endangered Species Act.

However, pursuant to the Wetlands Protection Act (the WPA or Act), standards for inland wetlands (310 CMR 10.59) pertaining to projects that impact rare species habitat, a determination must be made as to whether the project meets the performance standards of the Act including a determination that the project will have no short- or long-term adverse effects on the habitat. The proponents submit that a WPA variance is not required for the reasons presented below.

11.11.1 No Adverse Impact

When work is proposed in a rare species habitat, the applicant has the burden of demonstrating that the alteration will not adversely affect the habitat of the local population of that species. Pursuant to DEP Policy 90-2 "Standards and Procedures for Determining Adverse Impacts to Rare Species Habitat," to meet this requirement the applicant must: (1) identify the rare habitat requirements of the rare species; (2) identify the habitat characteristics of the resource area and the important wildlife functions provided for that rare species; and (3) demonstrate that the proposed project will not alter any habitat characteristics which are providing important wildlife functions for the rare species. Wildlife habitat functions to be analyzed are important food, shelter, migratory or overwintering areas, and breeding areas.

11.11.1.1 Habitat Requirements of the Rare Species

Threespine Sticklebacks are found along the coast of Massachusetts in estuaries, salt marshes, and tidal creeks. They are equally at home in fresh or salt water. (D. Humphreys Stover, M.D., Reports on the Fishes, Reptiles and Birds of Massachusetts, Commission [relative to] Zoology and Botany Survey of the State, 1839. Boston [Fishes, pp. 1-2-2]). The only totally landlocked population in Massachusetts is that in freshwater ponds in Olmsted Park. It is possible this population was introduced as part of a planned natural history museum. These water bodies provided cool, relatively clean water, and other habitat elements such as abundant food supply, protective shelter and ample nesting areas. See Section 11.3 for a description of the natural history of the Threespine Stickleback.

11.11.1.2 Habitat Characteristics of the Resource Area and the Important Wildlife Functions

In Olmsted Park the Stickleback populations are established in shallow, spring-fed water. A large water body does not appear to be a requirement, evident their successful population in the small, shaded and cool water of Spring Pond. Shade from bordering vegetation and leaf litter provides shelter. The fish is omnivorous, feeding on a wide variety of food sources including small invertebrates, fish eggs, fish larvae, and small fish fry. It has apparently reproduced successfully in this habitat for over 100 years.

11.11.1.3 The Proposed Project will not alter any Habitat Characteristics

There are two Threespine Stickleback populations in Olmsted Park, one in Willow Pond and the other in Spring Pond. With regard to the Spring Pond population, there is no work planned in this pond other than runoff control measures, utilizing a small, shallow settling area planned upstream of Spring Pond (described in Section 11.6). This pool will only serve to capture urban pollutants and sedimentation from entering Spring Pond, thereby preserving vital water quality of Spring Pond (see Figure 11-2).

In Willow Pond, the shallow shelf where the Stickleback population is found will not be dredged. To protect this shelf area from nearby dredging activities and siltation, a silt screen will be installed around the shelf area. If deemed necessary, sheeting may

also be installed as further protection. The sheeting will be removed only after construction is completed in order to insure the stability of the shelf. Gravel backfilling or subsurface gabions will make up any change in shelf elevation. The intent is to cause no alteration to this habitat. As a further protective measure, prior to construction, the Willow Pond Sticklebacks will be captured and held in a temporary pool that will simulate the current habitat characteristics (see Section 11.8). Upon completion of construction activities in Willow Pond, Sticklebacks will be returned (within a period of one year, but not during the breeding season) to their present, unaltered habitat adjacent to the inlet downstream of Spring Pond.

A small gravel berm will be constructed to protect the Stickleback habitat from larger fish that would return to Willow Pond once it is deepened by dredging. Similarly, the maximum water level will be controlled by a new outlet structure. This will consist of an open vertical pipe into which water will flow should the water level raise above or overtop the pipe inlet (Figure 11-3). The pipe will empty into the Babbling Brook, which flows into Leverett Pond downstream.

11.11.2 If a Variance Should be Required

Pursuant to the Wetlands Protection Regulations (Regulations) for inland wetlands (310 CMR 10.59) pertaining to projects that impact rare species habitat, a project within a habitat of a state-protected species cannot be permitted by the issuing authority unless a determination is made that the project meets the performance standards of the Regulations, including a determination that the project will have no short- or long-term adverse effects on the habitat. DEP Policy 90-2 provides guidance to applicants and issuing authorities in making that determination. As presented above, we believe the project with proposed mitigation measures will result in no short- or long-term adverse effects to the Threespine Stickleback. Should the Boston Conservation Commission or DEP not agree that the proposed activities can be authorized via an Order of Conditions, the activities in the habitat of Threespine Stickleback will require a variance pursuant to 310 CMR 10.05 (10).

Issuance of a variance is dependent upon a demonstration by the applicant that the proposed activity meets the following three criteria: (1) there is an overriding public interest, (2) alternatives are infeasible, and (3) mitigation measures exist to protect the interests of the Wetlands Protection Act. Although it is not likely that a variance is required, the following discussion is made to demonstrate that a variance can be justified if it should be required.

11.11.2.1 Overriding Public Interest

The Emerald Necklace is the last great urban park system that Fredrick L. Olmsted planned in the nineteenth century during a remarkable forty-year career that also spawned the design and construction of Central Park in New York, Prospect Park in Brooklyn, Washington and Jackson Parks in Chicago, Belle Isle Park in Detroit, the park on Mount Royal in Montreal, and multi-park systems in Buffalo, Rochester NY, and Louisville, Kentucky.

Of Olmsted's many accomplishments, the Emerald Necklace system is considered the most complex, integrated, and cohesive system of large and small parks and parkways providing green space connections between numerous and varied neighborhoods. Listed on the National Register of Historic Places, Olmsted's Emerald Necklace parks are a preeminent example of the late nineteenth-century American Parks Movement that grew out of the need for improved quality of life in expanding urban and industrial centers that were faced with deteriorating social and sanitary conditions. The Emerald Necklace also was unique in its multipurpose functions--improving sanitary conditions and flood control, while serving as an educational resource and an active and passive recreational resource for the City and Town.

Since its creation around the turn of the twentieth century, the Emerald Necklace in general, and the area surrounding the Muddy River in particular, have been subject to the effects of gradual yet extensive urbanization. As the populations of Boston and Brookline grew, they brought with them more buildings, roadways, traffic, and congestion. The results of development on the watershed have been significant. Flooding has worsened because there is little natural storage left in the heavily paved watershed, and sediment and debris have washed into the Muddy River, choking off flood carrying capacity. Water quality has deteriorated as an array of natural and man-made compounds are carried off the land surface during rainstorms and deposited into the river. Non-native invasive species of flora such as *Phragmites* and knotweed have overtaken portions of the banks of the river, pushing out native species, creating safety hazards, eliminating natural habitats and greatly limiting the diversity of wildlife that can live within the corridor. The distinctive landscape designed by Frederick Law Olmsted has declined in richness and diversity, the present landscape lacking the subtlety and coherent massing of plant materials that once characterized the landscape. The parks in the Emerald Necklace are a designated Boston Landmark and are listed in the National Register of Historic Places. The Muddy River and the associated parkland have extremely high societal value and are within walking distance of many prominent institutions, cultural landmarks, and diverse neighborhoods.

In addition, as observed by Hartel *et. al.*, the park population of Threespine Sticklebacks is in danger of extirpation due to the impacts of urban pollution and sediment infilling of the ponds. The project as proposed will revitalize the Stickleback habitat to help insure the survival of this threatened species for generations to come.

11.11.2.2 Infeasibility of Alternatives

The proposed project presents an opportunity to enhance aquatic and riparian habitat because it would remove the present deposits of organic sediment and root mats along the shoreline which do not provide suitable habitat for the Threespine Stickleback. The proposed dredging will expose native granular sediments that will provide improved spawning habitat. The proposed dredging will also have a beneficial impact on the spawning of anadromous fish. The Blueback Herring (*Alosa aestivalis*), which is known to migrate up the Muddy River to Leverett Pond, spawns in the open water where the eggs sink to the bottom. Removal of contaminated

sediment will increase the survival of herring eggs. Another anadromous fish, the shad, might also migrate further into freshwater and spawn on sandy pebbly bottoms in Leveret Pond once again.

The only alternative to the proposed project would be to not dredge Willow Pond. Under a no-action alternative, none of the project elements to enhance aquatic and riparian habitat would be implemented. Indigenous plant species, including emergent wetland vegetation, shoreline plants, shrubs and canopy species would not be planted. Damaged turf and shoreline would not be re-vegetated with grass and damaged or lost shrubs would not be replaced. The no-action alternative also would not include the removal of *Phragmites* and Knotweed. The original shoreline would not be preserved and plants from the Olmsted plant list would not be re-introduced. The “urbanized” wildlife habitat would remain essentially unchanged from the present, as would species diversity.

The no-action alternative would continue to impact the habitat of Threespine Sticklebacks in Willow Pond due to continually shoaling from sedimentation, varying water levels, increased water temperatures and degraded water quality. Hartel et al (2002) have indicated that, due to deterioration of water quality and sediment infilling, the threatened species Threespine Stickleback is in danger of extirpation within Olmsted Park. There is no reasonable alternative to this project that will protect and preserve the habitat of the Threespine Stickleback on a long-term basis in Willow Pond and Spring Pond.

An alternative that was considered to protect the Threespine Stickleback in Willow Pond was to capture and move that population from Willow Pond and relocate it into Spring Pond. However, according to Professor Hartel (Cortell, personal communication), the Threespine Stickleback population in Willow Pond is of a larger body size and a different morph from the physically smaller, Spring Pond fish. It was determined that mixing the two populations could have unpredictable negative impacts, including overcrowding, competition for food, shelter and breeding area.

11.11.3 Development of Mitigation

Mitigation plans for each of the two Threespine Sticklebacks morphs are different. For the Spring Pond population, there are no plans to perform any work in Spring Pond. The only action proposed, a sedimentation bay/settling area, will be constructed upstream of Spring Pond to improve water quality. Once completed and stabilized, the forebay will be used as the temporary (6 to 12 months) holding area for the Willow Pond Sticklebacks.

In Willow Pond, the shallow shelf area where the Sticklebacks are presently found will not be dredged. However, in order to protect the Stickleback population from any incidental impacts during construction activities that are scheduled in the main part of the pond and around the border of the pond, it is proposed to temporarily relocate the population for a period of less than one year. The intent is that the Willow Pond Stickleback population will be carefully returned to its current habitat after proposed

project improvements are completed. Mitigation plans for both areas of Stickleback habitat are discussed in detail in Sections 11.5, 11.6, and 11.7 of this report.

In conclusion, the work within the habitat of the Threespine Stickleback has been designed in compliance with the performance standards of the Wetlands Regulations. As described above, this work can comply with DEP Policy 90-2 for work within habitats of state-listed species, making it permittable via an Order of Conditions. Should it be determined that a variance is required, documentation is provided in Section 11.11.2 of this SFEIR that the variance criteria are met.

12

Section
Twelve

Section 12

Recreation Impacts

12.1 MEPA Certificate and FEIR Comments

The MEPA Certificate on the FEIR stated that the SFEIR should investigate (1) whether construction staging areas, other than Daisy Field, are available in the area and/or (2) that plans to avoid minimize disruptions to Daisy Field during the construction process be presented. These requirements were based on comments received from youth leagues using the fields.

Comments on the FEIR from the Jamaica Plain Regan Youth League raised concerns regarding seasonal conflict with sport activities at Daisy Field. Other comments noted that previous plans to reorient the northerly diamond of Daisy Field would put it too close to the southerly field, and are not adequate for regulation baseball fields. Further concerns were raised with the possibility of infield clay draining into Leverett Pond.

The JP Youth Soccer League suggested that the former Kelly Rink site be reconsidered as a staging area.

12.2 Staging Alternatives to the Daisy Field

12.2.1 DEIR and FEIR Considerations

Eleven staging areas were considered in the DEIR with five recommended for inclusion as dredging staging areas and one (the former Kelly Rink) suggested as a truck staging site. The FEIR proposed seven dredging staging areas, as follows: four for the Back Bay Fens – Charlesgate, Agassiz Road, Lagoon, and an area upstream of the Fens Bridge; two for the Riverway – the Fens/Avenue Louis Pasteur area, and the Netherlands Road staging area; and one for Leverett, Willow and Ward's Ponds -- the Daisy Field staging area.

12.2.2 Staging Area Alternatives

Staging to access Leverett Pond and to dewater dredge spoils from Leverett Pond, Willow Pond, and Ward's Pond will require a fairly flat area of about 45,000 square feet (just over an acre). These criteria were used in searching for an alternative to Daisy Field.

On the southwestern side of Leverett Pond, the area of Daisy Field is of sufficient size to accommodate staging, it is relatively flat (2 percent grade), and it provides direct access to Leverett Pond. However, is not favored for use as a staging area by the local youth soccer leagues as noted above.

Other areas considered in the DEIR as staging areas include:

- *East side of Leverett Pond. There is one area on the eastern side of Leverett Pond that could be considered as a staging area or access point. This area is opposite the Village Brook outlet on the east side of Leverett Pond but is not large enough (only 6,000 sf) and too steep (6% slope) to consider for a staging area. All other portions of the east side of the pond are even steeper. Therefore, these alternatives on the eastern side of Leverett Pond would not meet the project's needs.*
- *West side of Leverett Pond. On the west side of Leverett Pond, there are two alternative staging areas: 1) there is a main parking area that covers about 21,000 square feet, or less than 0.5 acres, which is very long and narrow. This site is too small and the long narrow shape would not accommodate dewatering; and (2) there is a similarly shaped area near the Allerton Overlook that, again, is too long and narrow to be useful for a staging area.*
- *West side of Willow Pond. There is an area of about 15,600 square feet (0.35 acres) on the west side of Willow Pond. This site is not large enough for a staging area but is suitable for an access area for dredging Willow Pond.*
- *Area surrounding Ward's Pond. Ward's Pond has very limited area for staging. A parking area of about 0.25 acre at a 4% slope is the only area available.*

Comments received from the FEIR resulted in reconsideration of the former Kelly Rink site for use as a staging area.

This site is relatively flat and has about 35,000 square feet (0.8 acre) of available area. Although this site is not directly adjacent to Leverett Pond, access is available by Willow Pond Road. Access for dredging could potentially be provided at the site on the eastern shore of the pond opposite the Village Brook outfall; however, the pipeline to pump dredged spoils to the Kelly Rink site would still need to pass by the baseball field. To provide sufficient dredging capabilities, one access point would be required.

The FEIR indicated that the Threespine Stickleback (a threatened species) habitat was critical to the survival of a unique population in Massachusetts. Habitat for this species is located less than 40 feet and downgradient from the former Kelly Rink site. Therefore, additional mitigation measures (described in Section 11) will be implemented to avoid potential impacts to the species.

In summary, the former Kelly Rink site is the most feasible site that offers sufficient space and conditions for a dewatering staging area.

13

Section Thirteen

Section 13

Response to Comments

FEIR Certificate issued May 1, 2003

1 – SFEIR should include alternative analysis for DEP to evaluate any requests for Variances from the MA Wetland Protection Act.

Response: The proposed Muddy River Flood Control, Water Quality and Habitat Enhancement and Historic Preservation Project qualifies as a limited project under 310 CMR 10.53(4) which allows projects to proceed that “will improve the natural capacity of a resource area(s) to protect the interests” of the Act, provided the activity does not adversely affect the ability of the resource area to protect the other interests of the Act or result in no change (neutral effect) to the capacity of the resource area to protect the other interests of the Act, as described in more detail in Section 5 of the SFEIR.

An alternatives analysis for a variance request was included in the FEIR.

2 – SFEIR should include additional information on alternative management structures.

Response: We have worked with MEPA to confirm the information presented in the SFEIR is consistent with the Secretary’s direction.

3 - SFEIR should include a summary of all permits needed for each subarea of the project, and demonstrate either how the project design meets applicable performance standards, or how the project meets criteria for a variance from applicable performance standards.

Response: A summary of all permits needed for each subarea of the project is included in Section 4.2 of the SFEIR and a discussion on how the project design meets applicable performance standards is included in Sections 4.2 and 5 of the SFEIR.

4 – SFEIR should document coordination with permitting agencies.

Response: Coordination with permitting agencies is documented in Section 4.4 of the SFEIR.

5 – The SFEIR needs to include much more information on the aspects of the project which does not appear to meet limited project status and discuss how those aspects of the project might qualify for variances from the Wetland Protection Act regulations.

Response: The applicant is proposing that all aspects of the proposed project can be permitted under limited project provision 310 CMR 10.53(4), see Section 5 of the SFEIR.

6 – Verify that the proposed level of dredging on the Back Bay Fens is still necessary to achieve flood control goals since dredging at Charlesgate was more extensive than originally anticipated.

Response: More material was removed from Charlesgate than originally anticipated, however the final dredged grades match the modeled grades so that the modeled flood results are still valid. The original calibration might have been affected by the additional material in Charlesgate but there was a very small headloss in this section so that the impact would have been very small on the model.

7 – The SFEIR should re-evaluate the need for bank-to-bank dredging in the Riverway subarea, and include any additional information necessary to evaluate a variance request, if a variance proves necessary. Bank-to-bank dredging of the Riverway does not appear to meet the limited project provisions.

Response: Dredging in the Riverway is proposed to 1) remove dense Phragmites stands that block flow at specific locations to alleviate flooding and 2) to remove contaminated sediments from the riverbed. Dredging in the Riverway is proposed as a limited project per 310 CMR 10.53(4). Please see Section 5 for a discussion of how this project element complies with the performance standards of the Wetland Protection Regulations.

8 – Dredging of the three ponds can meet limited project provisions, but wetland replication must take place in the affected ponds, not in the Fens as proposed. The SFEIR should provide additional information to demonstrate that the dredging operation (including replication) will be constructed in a manner that meets limited project provisions.

Response: Impacts to 3,820 square feet of BVW in Olmsted Park are being compensated for by replication of approximately 4,340 square feet of new BVW in Olmsted Park (a replication to loss ratio of 1.14)(see Table 5-5 in the SFEIR).

The ponds will be dredged using hydraulic dredging as described for the Back Bay Fens in Section 5.4.1.2. The sediment slurry will be transported to a dewatering area to prevent sediments from entering adjacent wetland resource areas. Dried sediment will be disposed of off-site in accordance with local, state, and federal requirements. Effluent from the dewatering operation will be returned to the river once sediment has been allowed to settle out in the dewatering basin.

Wetland replication procedures are described in Section 5.7.1 of the SFEIR. Haybales and silt fence will be installed around the perimeter of the sites prior to the construction of the replication areas to prevent sediments from entering the river and adjacent wetland resource areas. This sedimentation barrier will remain in place until new vegetation has been established. The slopes of the replication areas will not be greater than 3H:1V.

9 – The proposal for in-pond sedimentation basins would require a variance. The SFEIR should reevaluate the need for in-pond sedimentation basins, and evaluate this aspect of the project in light of the variance criteria.

Response: In-stream sedimentation basins are no longer proposed. See Section 2 of the SFEIR for a current, updated description of the project and see Section 5 for a discussion of issues related to wetlands and compliance with the Wetlands Protection Act.

10 – The SFEIR must evaluate alternative sediment removal methods to the in-stream sedimentation basins, since DEP has determined that they do not meet limited project provisions and cannot meet the variance tests.

Response: In-stream sedimentation basins are no longer proposed. See Section 2 of the SFEIR for a current, updated description of the project and see Section 5 for a discussion of issues related to wetlands and compliance with the Wetlands Protection Act.

11 – The SFEIR should quantify BVW impacts and ensure that replication meets applicable performance standards.

Response: BVW impacts are quantified in Tables 5-4 and 5-5 of the SFIER. A post-construction monitoring program is in place to ensure that the performance standards for wetland replacement areas [310 CMR 10.55(4)(b)(1-7)] are met, see Section 5.7.1 of the SFEIR.

12 – The SFEIR should examine whether the daylighting of the river for the Fens Bridge and former Sears parking lot could provide an opportunity for BVW creation.

Response: The SFEIR proposes to establish wetland replication areas in conjunction with the two sections of culverted flow which will be restored to open channel flow: 1) at the former Sears parking lot (between the Riverway and Brookline Avenue), and 2) at the Avenue Louis Pasteur. Approximately 6,760 square feet of new BVW will be established along the areas where the river will be daylighted (see Section 5.7.3). As project plans develop further, replication in the daylighted sections will be expanded, if possible.

13 – The SFEIR must examine alternative methods of sediment impoundment that are consistent with the water quality regulations since, according to the FEIR, the in-stream sedimentation basins are required to impound sediment associated with floodwater (not for flood control) and as such, do not meet the requirements of water quality regulations (314 CMR 9.00).

Response: Since the FEIR, there have been discussions with DEP on this issue. As a result of these discussions, the position of the proponent is that a variance is not required.

14 – The SFEIR must examine the feasibility of alternatives to bank-to-bank dredging in the three ponds that would preserve existing BVW (exclusive of *Phragmites* and other invasive species) and leave bank intact.

Response: There are no feasible alternatives to reduce the dredging footprint in the three ponds in Olmsted Park. Both Leverett Pond and Willow Pond have been found to contain toxic sediments (see Section 5.4.1.1 of the SFEIR). Dredging will remove contaminated sediments and expose cleaner sediment and result in deeper water depths in the ponds. See further discussion in Section 5.4.3.2 of the SFEIR. There will be approximately 3,820 square feet of permanent loss of BVW around the ponds in Olmsted Park from historic shoreline restoration and sediment removal. Any loss of BVW in Olmsted Park will be mitigated by the construction of BVW in Olmsted Park via replication of 4,340 square feet around Leverett Pond, resulting in a net gain of 520 square feet of BVW. This area was chosen for wetland replication due to the minimal grading needed to establish appropriate elevations.

15 – The SFEIR should include a water quality monitoring program tailored to each specific subarea of the project.

Response: See Section 7.4.1.4 of the SFEIR for water quality monitoring program information.

16 – The SFEIR should respond to concerns of DEP and others related to the proposed sediment management plan.

Response: The SFEIR addresses the issues raised in the DEP comment letter and also see responses to DEP comments numbers 10-18 to 10-23.

17 – The SFEIR should investigate alternative construction phasing to dredging followed by stabilization/restoration work, with dredging and reconstruction activities completed in geographic subareas prior to work beginning in another subarea.

Response: The ACOE prepared their feasibility document and suggested that the construction proceed in two phases. The first phase would be construction of the infrastructure (daylighting, culverts and bridge rehabilitation) followed by a second phase including the dredging and restoration. As long as the recommended construction mitigation procedures are followed for stabilizing the shoreline and disturbed areas prior to final rehabilitation there should not be significant additional sediment runoff into the Muddy River.

18 – The SFEIR should present more information or justify the conclusions reached in the reduced sedimentation rates and claimed improvements in water quality from the proposed BMPs.

Response: Additional meetings have been held with DEP in preparation of the SFEIR and the sedimentation rates and reduction in sedimentation from BMPs has been modified based on those meetings.

19 – The SFEIR should evaluate the potential for increased compliance with the standards for total suspended solids (TSS) removal contained in the DEP Stormwater Management Guidelines. The SFEIR should evaluate the ability to target the largest nonpoint sediment sources from the largest drainage catchments area for TSS removal and other treatment as appropriate.

Response: Additional meetings have been held with DEP in preparation of the SFEIR and the target reduction in suspended solids has been discussed and the 30 percent target has been retained.

20 – The SFEIR should include any results available from the BMP Pilot Program.

Response: BMP pilot program results have been included in Section 7.

21 – The SFEIR must present a full discussion of alternative management structures, including the proponent’s preferred management structure, the “Rowe cabinet structure,” and the structure proposed by the Emerald Necklace CAC and outlined in a memo from the CAC to the proponents dated December 23, 2002. For each alternative, the SFEIR should evaluate how the management structure would work, what the responsibilities of each participant would be, how the structure can advance the project goals, and how the structure can meet the requirements of the MOU and the various certificates. The discussion should also demonstrate how the proposed management structure would protect the Commonwealth’s investment and the structure would be consistent with EOEA’s Section 61 obligations.

Response: We have worked with MEPA to confirm the information presented in the SFEIR is consistent with the Secretary’s direction.

22 – SFEIR must specify how each management structure would incorporate the Maintenance and Management Oversight Committee (MMOC), and should demonstrate that the structure provides a role to the MMOC commensurate with the level of responsibility and involvement for the committee required by the Charlesgate Phase I Record of Decision.

Response: We have worked with MEPA to confirm the information presented in the SFEIR is consistent with the Secretary’s direction.

23 – The SFEIR should include a Draft MOA that specifies the maintenance and management structure and the roles and responsibilities of the various signatories. The MMOC should be a signatory to the MOA. The MOA should broadly outline enforceable performance standards, including commitments to improved stewardship, historic preservation and maintenance of parklands, implementation and maintenance of BMPs, coordination of maintenance activities across jurisdictional boundaries, appropriate staffing commitments, commitments to provide information among the signatories and to the public and EOEA, dispute resolution procedures, and minimum requirements for frequency of top level management meetings.

Response: The Draft MOA has been included and is still under negotiation. Comments from signatories have been included with the Draft MOA.

24 – The SFEIR should include a maintenance and management plan (based on the outline contained in DEM’s comment letter dated April 8, 2002), for the park system that includes the following information:

1. Overall management philosophy and vision;
2. Management, staffing, equipment, tasks, and schedules, with associated costs;
3. Monitoring procedures to assess the continued health and integrity of the project;

4. Measurable performance standards for appropriate resources;
5. Guidelines for preservation maintenance and monitoring;
6. Management structure and coordination;
7. Management policies related to protection and sustainable use of the parks (e.g., vehicular and pet control);
8. Reporting procedures and enforcement; and
9. Training requirements.

Response: A Management and Maintenance Plan has been prepared with the assistance of the MMOC and DEM as part of a subcommittee and provided as part of the SFEIR in a CD. The Management and Maintenance Plan identifies future target staffing needs and identifies the current gaps that will need to be closed.

25 – Proponents should use DEM’s assistance in development of the maintenance and management plan.

Response: See response to Comment No. 24.

26 – The SFEIR should quantify the amount of resources (human, financial, and other) currently expended on maintenance and management, and how future obligations would increase in response to the requirements of this Certificate and the final maintenance and management plan.

Response: See response to Comment No. 24.

27 – The SFEIR should identify any potential deficits between future maintenance and management needs and anticipated budgets.

Response: See response to Comment No. 24.

28 – If shortfalls exist, the SFEIR should consider a plan to fully engage the Emerald Necklace Conservancy (ENC) in a public-private partnership, with ENC using its expertise to raise private funds to offset deficits.

Response: The Plan includes the plan to engage staff and the ENC has provided comments on the MOA indicating their willingness to assist in raising funding for the maintenance of the project.

29 – The SFEIR must contain enforceable commitments and a timetable for restoration and reopening of the Carlton Street footbridge in its current location.

Response: Section 10 summarizes the current status of the Charlton Street footbridge.

30 – The SFEIR must address the requirements of the DEIR Certificate relative to the unauthorized “dirt bike path” which stated that the proponent should determine ownership of the area and include plans for restoration of the area if the City of Boston were found to own the parcel. .

Response: A plan for dealing with the unauthorized dirt bike path is included in Section 10.

31 – The SFEIR should include additional rare species mitigation if plans for work in areas that provide habitat for rare species change as a result of the additional analysis required elsewhere in this Certificate.

Response: There have been no changes that would result in impacts to new areas that provide habitat for rare species.

32 – The SFEIR should investigate if other sites than Daisy Field are available for construction staging, and/or present plans to avoid or minimize disruptions to Daisy Field during the construction process.

Response: Alternative sites are identified in the SFEIR.

33 – The SFEIR should include responses to comments received, with a level of detail and analysis appropriate to the comments made. The SFEIR should present additional data or narrative as appropriate to respond to the comments received. The SFEIR should contain an indexed response to comments section that enumerates individual points within comment letters and directs reviewers to the appropriate section of the document where the response is located.

Response Appendix A contains the Certificate and comment letters with the questions or comments indexed. This Section 13 contains responses and index to appropriate SFEIR section.

34 – The SFEIR should contain proposed Section 61 Findings for each state agency that must take an Agency Action associated with the project. The SFEIR should include a summary of all mitigation measures to which the proponent has committed, and include details on funding responsibilities and timetables for implementation.

Response: Section 61 Findings are presented in Section 14 of the SFEIR.

Comment Letter 1

John A. Schemmer, 33 Euston Street, Brookline, MA 02446

1-1) Opposed to re-opening the Carlton Street foot bridge because of lack of historical significance, public safety, cost, and other issues.

Response: The design review process for the Carlton Street footbridge is moving forward in accordance with the vote of Spring 2003 Town Meeting.

Comment Letter 2

Marianne Connolly, Program Manager, Regulatory Compliance, Massachusetts Water Resources Authority, 100 First Avenue, Boston, MA 02129

- 2-1) If groundwater will be discharged to combined sewers obtain MWRA Sewer Use Discharge Permit.

Response: No discharges to the MWRA sewer system are anticipated.

- 2-2) Obtain 8M permit from MWRA to minimize risk of damage to MWRA sewers in the area.

Response: An 8M permit will be obtained, if necessary. See Section 6 of the SFEIR.

- 2-3) To assist in inter-agency coordination, staff from MWRA's CSO Group will be available to work with appropriate governmental agencies as the project gets underway particularly the operators of the Boston Water and Sewer Commission's gatehouses.

Response: Comment acknowledged.

Comment Letter 3

Patricia Huckery, NHESP Endangered Species Project Analyst, Division of Fisheries & Wildlife, Commonwealth of Massachusetts, One Rabbit Hill Road, Westborough, MA 01581

- 3-1) Recommends one change to the "Survey and Capture Protocols." To avoid killing sticklebacks, the water temperature in the transfer buckets must be equalized with water in the temporary holding pond prior to releasing the captured fish.

Response: Water temperature in the bucket and release pool will be equalized as stated in Section 11 of the SFEIR.

Comment Letter 4

Valerie Fletcher, Executive Director; Kristin Schneider, Project Coordinator, Adaptive Environments, 374 Congress Street, Suite 301, Boston, MA 02210

- 4-1) Develop an explicit maintenance plan to maintain Americans with Disabilities (ADA) compliance of non-paved pathways.

Response: See the letter provided by Boston, which may be found at the end of this section of the SFEIR.

- 4-2) An explicit maintenance plan is needed to maintain ADA compliance of paved pathways in the winter.

Response: See response to Comment No. 4-1.

- 4-3) Bay Fens pedestrian bridges must be made ADA compliant.

Response: See response to Comment No. 4-1.

- 4-4) Evaluate the original Olmstead networks of pathways to assess their current usage patterns.

Response: This activity would be more appropriate as part of the overall Park Master Plan.

- 4-5) Use textural surface on all ramps.

Response: Textural surfaces will be considered in the context of future design work as this project moves through the design process and compliance with ADA is evaluated.

- 4-6) Updates and additions of benches should be a mix of choices (some with arms and some without).

Response: Style choices for future benches will be based on a number of factors including durability, historic appropriateness, and compliance with the ADA.

Comment Letter 5

Joanna B. Wexler, Chair, Town of Brookline Conservation Commission, Town Hall,
333 Washington Street, Brookline, MA 02445

- 5-1) The Commission is not able to take a position on whether portions of the project can be permitted directly by local conservation commissions as a limited project while portions may require approval from DEP as a Variance project based on the information provided. The Commission is concerned about the significant short-term impacts to wetland and water resources from dredging and expects the proponents to work closely with the Conservation Commissions and DEP as the permitting process evolves.

Response: See response to Comment 5. The proponents will continue to work with the DEP and the Conservation Commissions through final design and permitting.

- 5-2) The long term success of this project depends on adherence to the commitments being made to maintenance in the drainage infrastructure that carries runoff into the Muddy River and surrounding areas. We expect the permitting agencies to impose requirements to address these maintenance commitments, and to enforce them.

Response: The proponents for this project will be entering into a MOA and an MOA with the State of Massachusetts wherein the various maintenance requirements will be set forth.

These agreements will set impose maintenance requirements on the property owners whose holdings are impacted by this project.

- 5-3) Define a clear role for the Muddy River Restoration Project Maintenance and Management Oversight Committee (MMOC).

Response: A specific role has been developed for the MMOC through a series of joint meetings amongst the MMOC, the proponents, and MEPA. This role will be reflected in the MOA.

Comment Letter 6

Cathleen Cavell, Co-Chair, Friends of the Carlton Street Footbridge; e-mail

- 6-1) FEIR certificate should state that: park entrance be restored, a timeline established for the Town of Brookline to apply for state and federal funding, remedies to be used if the Town of Brookline continues to thwart the regulatory agencies should be identified, and oversight of the Town of Brookline.

Response: A specific timeline and for design and funding decisions associated with the Carlton Street footbridge is included in Section 10 off the SFEIR.

Comment Letter 7

Christine Oddleifson, Executive Director, Brookline Greenspace Alliance, 40 Webster Place, Brookline, MA 02445

- 7-1) Assure that funding will be in place for BMPs and the long-term maintenance and management of the park.

Response: The funding strategies for BMP's and long term maintenance and management of the park are set forth in Sections 7 and 9 of the SFIER respectively.

- 7-2) Include restoration of the Carlton Street footbridge in the project.

Response: A specific timeline and for design and funding decisions associated with the Carlton Street footbridge is included in Section 10 off the SFEIR.

Comment Letter 8

John Bain, Chairman, Park and Recreation Commission, Town of Brookline, 652 Hammond Street, Chestnut, Hill, MA 02467

- 8-1) Letter in support of the project

Comment Letter 9

Margaret Van Deusen, Deputy Director/General Counsel; Kate Bowditch, Senior Environmental Scientist and Policy Analyst; Charles River Watershed Association, 48 Woerd Avenue, Waltham, MA 02453

- 9-1) We ask that you require the installation of additional silt curtains near the outlet of the Muddy River, to be in place throughout dredging activities on the Muddy River, and another permanent turbidity or TSS monitoring station downstream of such a device prior to the river's discharge to the Charles River.

Response: The additional silt curtain and monitoring station can be added to the specifications for dredging and has been added as a mitigation measure in Section 14. This would be similar to the silt curtain and monitoring conducted during the Charlesgate work.

- 9-2) We recommend that the proponents work closely with the TAC, the MMOC, and the DEP to develop a detailed sets of guidelines for wet weather management; that only small sections of the river be dewatered for dredging at any time; and that a more extensive wet weather water quality monitoring and mitigation plan be established.

Response: In response to this comment a much more substantive plan is set forth in Section 7 of the SFEIR.

- 9-3) ...Banks that have been exposed during dredging must immediately be stabilized, using methods such as fiber mats and filter fabric, until bank restoration efforts are complete, and plant communities are sufficiently established to provide stabilization. Regrading efforts must also be managed to protect the river from eroding soils.

Response: Bank stabilization during construction is a critical element of the design, and the erosion control methodology is approved through the Conservation Commission permitting process. The work is also monitored through the Conservation Commission of each community involved in the project.

- 9-4) We ask that you require a more detailed monitoring program for the in-stream sedimentation basins to determine their impacts.

Response: A more detailed program has been included in Section five of the SFEIR. The ACOE will also set forth maintenance requirements of the over deepened channel sections in their maintenance manual.

- 9-5) We also ask that, should the quarterly water quality monitoring reveal that the goals for reductions in sediment loading are not being met, further BMPs be required.

Response: Requirements for the BMP program are included in the MOA to be signed as part of MEPA's requirements for this project to move forward.

- 9-6) Monitoring results from the current BMP pilot program should be used (and augmented as necessary) to develop a pre-dredging baseline data set.

Response: The data gathered in the BMP pilot program is not useful in a sediment pre-dredging baseline. Data is being gathered on specific BMP structures in order to confirm design and operational characteristics of the units for use in the project. The Annual Water Quality sampling program would be more useful in establishing trends in sediment loads and that is what the information will be used for.

- 9-7) Develop plans for erosion and bank stabilization in greater detail as project progresses, proponent should work closely with DEP and MMOC staff to develop plans that can be implemented by the contractors and monitored by the IEM, DEP staff, and MMOC.

Response: Similar to response 9.3, the details of the stabilization and erosion control plans will be included in the detailed design plans submitted for Conservation Commission approval. MMOC staff as well as others will have the opportunity to review these plans at that time for comments.

- 9-8) CRWA's interpretation of the Wetlands Protection Act is that only small portions of the project, namely the dredging of ponds in Olmsted Park, qualifies as a Limited Project, and the remaining portions of the project should proceed only under a Variance issued by DEP...

Response: See response to Comment 5. It is our opinion that the work proposed along the river for flood control and environmental restoration qualify as limited projects.

- 9-9) The FEIR was to contain significantly more detailed information on BMPs than it does...the BMP Program must have "measurable environmental performance standards" and benchmarks. These standards should be based on targeted goals for sediment removal, and should not rely on predicted model results but on actual water quality sampling results.

Response: The specific parameters for water quality testing are set forth in Section Nine for the SFEIR. Section Nine also described our target TSS rate, and the means and methods to be used in order to achieve the target goal.

- 9-10) Monitoring the BMP Program, measuring its success, and making recommendations for future improvements will be one of the most important roles of the MMOC...we ask you to require the proponents to commit to including the MMOC in the project management structure.

Response: The MMOC is included in the proposed management structure.

- 9-11) It is because of inadequacies in the Management Structure section of the FEIR that we ask you to require a Supplemental EIR (SEIR) for this project. The SEIR should include the MOU and the MOA, MDC's commitments to maintenance,

including BMPs, and financial obligations should be included in both the MOU and MOA.

Response: The information requested is contained in the SFEIR.

- 9-12) We support the minimum conditions for the MOA outlined by the ENCAC in its comment letter.

Response: See Comments 15.1 – 15.23.

- 9-13) The FEIR does not provide an adequate alternatives' analysis of management structures and therefore, does not properly comply with MEPA...The SFEIR should discuss in detail, specifically, the Environmental Joint Powers act and the Cabinet management alternatives, as well as the management alternative proposed by the ENCAC. These three alternatives (and the current preferred alternative) should be discussed in the context of the "critical" criteria proffered by the proponents at p. 6-12 of the FEIR: ability to retain ownership and maintenance responsibilities, and ability to include administration of public and private funds. The MOA provisions, and how they would differ, should be discussed for each of the alternatives in the SFEIR analysis. The SFEIR should also contain a forthright discussion of the disadvantages of the preferred management alternative and how those drawbacks can be overcome.

Response: The MMOC and the project partners have agreed upon a proposed cabinet structure. The draft MOA setting the working mechanisms of this cabinet structure is included in this SFEIR.

- 9-14) In view of the extensive discussions that have already taken place between the ENCAC and the proponents on management structure, we believe your certificate on the SEIR should clearly and in detail scope the alternatives analysis for the proponents...

Response: The MMOC and the project partners have agreed upon a proposed cabinet structure. The draft MOA setting the working mechanisms of this cabinet structure are included in this SFEIR.

- 9-15) We do not believe the preferred management structure in the FEIR provides a "structure and function" that will allow the MMOC to function as intended. The MMOC should participate in the planning and policy meetings to "review progress...and establish goals and programs for succeeding years.

Response: The MMOC and the project partners have agreed upon a proposed cabinet structure. The draft MOA setting the working mechanisms of this cabinet structure are included in this SFEIR.

- 9-16) We do not believe that the preparation of a SEIR to address inadequacies in the Management Structure section of the FEIR should impact the project schedule.

Response: The project proponents have worked with the Army Corps of Engineers, the MMOC, the CAC, and MEPA to use the opportunity to fully integrate the ACOE locally preferred plan into the SFEIR. This integration will greatly reduce time required to approve any modifications of permits after a Certificate is issued.

- 9-17) The Maintenance Plan's reports must be based on performance standards. These standards should be developed with input from the MMOC, prior to issuance of DEP permits and prior to release of state funding for the project.

Response: The Management and Maintenance Plan has been developed with the support of an MMOC subcommittee and is included in the SFEIR. The SFEIR must be completed and submitted to MEPA before EOEA will authorize the release of any funds.

- 9-18) We suggest that reports show progress relative to these performance standards and that deadlines for adopting performance standards be included in the MOA.

Response: Discussions with EOEA regarding the MOA are underway and performance standards are included in these discussions.

- 9-19) We recommend that the annual BMP Plan report be expanded to include the volume of sediment removed from catch basin cleaning programs and street sweeping programs.

Response: – The data base created by BWSC and the Town of Brookline will accumulate data on volume of catch basin cleanings and be provided in the Annual Update Report

During the preparation of the DEIR, we tried to obtain information on the volume of street sweepings with the objective of comparing the amount to the amount of sand applied to the roads. We found the values are very hard to compare for several reasons. The sweepings get dumped at the landfill and at best, you can only make an approximation at the volume in the piles. When compared to the sand applied to the roads, there was little correlation that we suspect was due to the inaccuracy of estimating the volume of street sweepings and also the fact that significant amounts of sweepings can also be from runoff of adjacent properties. We are not sure that the volume actually adds to better management of the sweeping program; however, assurance that the streets are swept on a regular schedule probably has more impact on reducing the sediment loads to the storm drains. We suggest that as part of the maintenance program, documentation of the street sweeping program be routinely gathered.

- 9-20) In general, maintenance is one of the most difficult aspects of any public parkland program. The investment of time and money in this project must be protected by a permanent change in maintenance programs, both in the parklands and in the storm drainage systems that flow into the Muddy River. The MMOC is the best way to ensure that the maintenance commitments articulated in the Maintenance Plan section are carried out.

Response: The Management and Maintenance Plan included in the SFEIR has included the involvement of the MMOC and the MOA will finalize the management organization and responsibilities of the management cabinet.

- 9-21) The potential for short-term water quality impacts during dredging are significant and this is an area of the project with many incomplete details, and there are potential long-term impacts of the project to the Charles River if the BMP program is not successful.

Response: Short term water quality impacts to the river were monitored during the dredging in the Charlesgate area. The DEP issued water discharge limits in the Water Quality Certificate and reviewed the data as the project was conducted. The construction mitigation managed the short term impacts and it is expected that an additional Water Quality Certificate will be issued as part of the final dredging program and also monitored by DEP.

Additional commitments to BMPs have been made in the SFEIR and results of the BMPs will be provided in the Annual Update Report.

- 9-22) If in-stream sedimentation basins are to be part of the project, then significant monitoring of their performance should be made. Such a study should include regular monitoring as suggested in Section 10 of the FEIR, plus similarly designed baseline monitoring in a nearby location of the river. Additional monitoring should be done immediately after a large storm, such as a 1-year or 10-year storm to see whether all of the sediment is in fact merely washed out during large storm events.

Response: Unlike catch basins or particle separators, the deepened channel sections would not be subject to washouts in larger storms separate from the surrounding river. If the velocity in the river increases during particularly large storms, sediment will be moved along the entire river bed and not just in the deepened channel sections. In fact the deepened channel would actually provide a larger cross sectional area in the immediate river area and velocity would actually decrease, thereby increasing the chances of capturing sediment compared to the immediate upstream and downstream river sections. The yearly monitoring in the FEIR would capture sediment buildup occurring in more frequent storms and more monitoring is not suggested. If a particularly large event (10 year or more) occurs, the annual monitoring event could be moved to just after the storm to check whether the storm deposited significant amounts of sediment or changed the characteristics of the deepened channel sections. It would also be possible to collect sediment data in several additional river locations when the deepened channel sections are being monitored to gauge the overall sediment trend in the river.

- 9-23) Monitoring and mitigation during the project implementation will be critical. The Independent Environmental Monitor who will be hired should work closely with the MMOC's Administrator in the field to support the MMOC's oversight responsibilities.

Response: If the proponents conduct the project construction an Independent Environmental Monitor will be hired. If the ACOE conduct the project construction MMOC will have to coordinate with the ACOE construction services organization.

- 9-24) All pollution prevention plans, and all data collected as part of the mitigation effort should be shared with the MMOC.

Response: See response to Comment No. 9-23.

Comment Letter 10

John Felix, Deputy Regional Director, Department of Environmental Protection, Northeast Region, One Winter Street, Boston, MA 02108 (or address on the letter: 205A Lowell Street, Wilmington, MA 01887)

- 10-1) ...we request that the proponents provide a re-analysis of the flood control model using the as-dredged conditions in Charlesgate in order to verify whether the proposed dredging in the Back Bay Fens is still necessary to achieve the desire level of flood control...

Response: In January, 2003 when the dredging was being completed in the river, two field conditions required that the hydraulic program be reevaluated. The furthest downstream section could not be dredged behind the portable dam and we found that a bottom slab under the bridge at Beacon Street limited the contractor's ability to dredge to the proposed depth for a short distance. By rerunning the hydraulic simulation we found that the river elevation at the Boston Gatehouse #1 would be raised by 0.07 feet (less than 1 inch) under design storm conditions. While this change was not considered significant, it did verify that the final conditions of the dredging were not significantly different than originally evaluated. In order for the proposed dredging in Back Bay Fens to be reduced, we would have had to see a significant reduction in the hydraulic grade as compared to the original evaluation as a result of the Charlesgate dredging. This information was provided to Boston and Brookline on January 30, 2003.

- 10-2) Documentation of the proposed dredging of the entire Riverway "bank-to-bank" is not adequate to meet the limited project criteria other than where Phragmites block the channel, specifically the Back Bay Yard, the Island Bridges near the Netherlands Road, and Brookline Avenue.

Response: Sediments in the Muddy River have been documented to be toxic to aquatic life. Sediment is likely to adversely affect benthic organisms and fish at all stations within the Riverway and there is potential for bioaccumulation of contaminants for species higher up the food chain that inhabit and/or feed in the area (see Section 5.4.1.1 of the SFEIR). Dredging in the Riverway is proposed in order to remove contaminated sediments from the riverbed for ecological restoration and to remove a source of pollution from being conveyed downstream throughout the river system and ultimately to the Charles River. The prevention of pollution interest, as well as fisheries and wildlife habitat, of the MA Wetlands Protection Act will be improved by the removal of contaminated sediments from the river and bank restoration/stabilization. Therefore, this portion of the project qualifies as a limited project in accordance with 310 CMR 10.53 (4), see Section 5 of the SFEIR.

- 10-3) No specific information including an alternative analysis is provided about how the work would meet the Variance criteria and how the proposed project will enhance wetland functions. It is DEP's opinion that, based on the documentation available to DEP, the proposed dredging of the Riverway does not qualify for limited project status and does not meet the criteria for a Variance.

Response: See response to Comment No. 9.

- 10-4) Dredging in the three ponds (Leverett, Willow, and Wards) can qualify for limited project status as long as dredging is limited to the removal of accumulated sediments and restoration of the functions of Land Under Water. Alteration of BVW must be avoided or minimized and any altered BVW must be replicated around the pond that it was associated with, not downstream in the Back Bay Fens, as currently proposed. Furthermore, the proposed construction of "sediment basins" within these water bodies is not permissible under the Wetlands Protection Act.

Response: See response to Comment No. 8.

- 10-5) *It is DEP's opinion that removal of the Phragmites is unlikely to improve water quality, unless areas where Phragmites are removed are stabilized to a higher level and whatever is used to stabilize the sediment has a lower Manning's frictional coefficient than the Phragmites. Of concern for bank and river bottom stability is the removal of Phragmites from the outside curve of each meander belt, contributing to bank scour.*

Response: Please see SFEIR Section 5.5.5.3. The planting shelves along the banks in the Riverway will be planted with persistent herbaceous vegetation to stabilize the banks replacing the functions and values currently proved by phragmites. Phragmites is currently present on about 35% of bank (by length); and in the proposed project, 100% of the bank (by length) will be stabilized by herbaceous vegetation.

- 10-6) It is DEP's opinion that the in-stream sedimentation basins cannot be approved under the limited project provisions and that they will not meet the criteria for a Variance. DEP disagrees that the basins will compensate for the sediment removal function being performed by Phragmites.

Response: See Section 2 of the SFEIR for a current, updated description of the project and see Section 5 for a discussion of issues related to wetlands and compliance with the Wetlands Protection Act.

- 10-7) The FEIR does not state whether the BVW alteration in the Back Bay fens will be restored in place or replicated elsewhere. Also, the FEIR does not state where replication of the 0.1 acres of BVW in the Riverway will be located.

Response: The BVW alteration in the Back Bay Fens is from gaining access to the river for bank restoration and dredging, and from restoration of Phragmites dominated BVW. All altered BVW will be restored in place as described in Section 5.4.1.2. In addition, wetland

replication is proposed in conjunction with the daylighted areas in the upper Fens, also described in Section 5.4.1.2, 5.7.3, and shown on Figure 5-9.

Replication of approximate 3,820 square feet of BVW loss in Olmsted Park will be replicated by the establishment of approximately 4,340 square feet of BVW in Olmsted Park. In the Riverway, replication of BVW will occur on planting shelves at a ratio of 2.6:1, replication area to lost area.

- 10-8) DEP strongly recommends that BVW creation be an integral part of the daylighting effort in order to provide habitat and a functional riverine area.

Response: *See response to Comment No. 12.*

- 10-9) Wetland replication areas should be located, constructed, and monitored in accordance with the Department's Inland Wetland Replication Guide, 2002.

Response: *Wetland replication areas will be located, constructed and monitored in accordance with the Department's Inland Wetland Replication Guide, 2002, see Section 5.7.1.*

- 10-10) The plans for the project should indicate the square footage of all wetland alteration, restoration and replication.

Response: *The plans for the project have been revised to indicate approximate square footage of wetland alteration, restoration, and replication. As the project design is developed further, the areas of alteration, restoration and replication will be refined.*

- 10-11) 314 CMR 9.00 prohibit the discharge of dredged or fill material for the impoundment or detention of stormwater for purposes of controlling sedimentation; thus, the dredging associated with the creation of sedimentation basins is not a permissible element of the project.

Response: *Since the FEIR, there have been discussions with DEP on this issue. As a result of these discussions, the position of the proponent is that a variance is not required.*

- 10-12) DEP requests more specific information on the need for bank-to-bank discharge in the ponds. DEP believes there are opportunities to reduce impacts by restricting dredging to the accumulated sediment, leaving the existing BVW and Bank by the ponds intact.

Response: *See response to Comment No. 14.*

- 10-13) Per 314 CMR 4.05(b)(3), the pH of pressate to be discharged to the river must be treated to reduce the level to between 7 and 8.3, not 7 and 9 as proposed.

Response: *Specifications will be revised to reflect a discharge pH of between 7 and 8.3. This revision has been included in Section 2 of SFEIR.*

- 10-14) DEP requires that the water-quality monitoring program(s) be tailored to address the conditions that occur in each segment of the river, given the suite of contaminants found in that particular area. The program(s) should be based on the results of sediment and elutriate testing and should include both organic and inorganic contaminants as well as appropriate physical parameters.

Response: See Section 7.4.1.4 of the SFEIR for water quality monitoring program information.

- 10-15) DEP will impose limits on the levels of contaminants that may be discharged to the river during dewatering operations, water to be discharged may require treatment to meet water quality standards.

Response: Specifications for Charlesgate required the contractor to meet water quality criteria contained in the Water Quality Certificate, including treatment if necessary. If any of those requirements change for future dredging contracts, we would anticipate using similar requirements.

- 10-16) Proposed once-per-week monitoring of discharge water to the river may be inadequate. Likely that at least daily monitoring will be required in the early stages of the project to ensure that water quality standards are being met. Once the treatment system's ability to discharge water in compliance with limitation imposed in the 401 Water Quality Certification is documented, the frequency of monitoring may be reduced.

Response: Similar to the response for Comment #10.15, the specifications for future dredging will require the contractor to meet requirements of the Water Quality Certificate.

- 10-17) Include a copy of the acute toxicity testing performed on the polymer proposed for use in the 401 permit application, along with chronic toxicity testing of the polymer, if available.

Response: Acute toxicity testing information was obtained from the Hazardous Materials Database (HDSB) (www.toxnet.nlm.nih.gov) an on-line database provided by the National Library of Medicine. Details of the testing information are not available however the information on this site is considered reliable.

- 10-18) DEP is concerned about the use of the "jetting ring" as an option of dredging...DEP suggests that a small working group should be established to discuss and review the results of any additional sediment sampling to determine the appropriate dredging technology(ies) and the management of any oversized materials (cobbles and boulders).

Response: The jetting ring option for hydraulic dredging was a recommendation of the manufacturer of hydraulic dredging equipment. They indicated that this device was specifically designed for the kind of application where cobbles and stones impede the effectiveness of a traditional hydraulic dredge. A working group could certainly be gathered

during the final design to discuss this technology and any other dredging issues before the plans and specifications are finalized.

10-19) Section 2.6.3: Lime may be necessary for reactive sulfide control and not just odor control.

Response: Acknowledged. Section 2.6.4 of the SFEIR clearly states the intention for having lime on site is for reactive sulfide control as well as odor control.

10-20) Section 2.6.3: DEP concurs with use of in-situ sampling data to classify sediment for reuse/disposal. DEP agrees that the contractor will have to provide for post-dredging sampling contingencies. DEP will review the final staging area plans and layout to ensure that such a contingency is practicable.

Response: No response required.

10-21) Page 2-25: In the first sentence after the boxed-table, add to the end of the sentence, "or for any disposal option."

Response: Acknowledged that DEP approval is needed for reuse or any disposal option when contaminants exceed the lined and unlined landfill criteria.

10-22) It was DEP's understanding that the root mat/stalks would be handled separately from the sediment to reduce disposal costs.

Response: DEP's understanding is correct. The root mats would be handled separately from the sediments as indicated in Section 2.3.3 of the FEIR for the purposes of dewatering, since the stalks and roots are not expected to contain as much excess water after draining. At this time, we are still carrying the disposal costs as contaminated material similar to the sediments because it is unclear how much sediment is bound in the root mass. We expect to take additional sampling during design to better determine if the root mat can be handled as an uncontaminated waste.

10-23) DEP never received the requested report by the ACOE entitled, "Biological Impacts for Dredging Justification."

Response: This report is contained in the ACOE report on the Muddy River project which is to be released publicly and available upon ACOE decision. A courtesy copy of the report was delivered to the DEP office, but was not routed to the proper office. This has been rectified and proper office within the DEP has received the report.

10-24) ...If the proponent decides to approach Massachusetts Turnpike Authority (MTA), we suggest they contact the personnel at the CA/T Project who are familiar with these technologies.

Response: Acknowledged.

- 10-25) Section 6.7.2, Corrective Measures: The rationale for using a storm event of 4 inches of precipitation in 24 hours should be explained. The definition of a "large event" should also be supplied.

Response: A 4 inch in 24 hour rain event is equivalent to a storm with a return period of just under 10 years. The design storm was approximately 8 inches over 37 hours. There is no regulatory definition of events requiring additional attention; however, a storm of nearly 10 year return period approaches the typical design capacity of most storm drain facilities. For storms below the 10 year event, there should be excess capacity in most well-designed storm drain elements. We recommended additional inspection procedures when the storm event approached typical capacity limitations of drainage facilities.

- 10-26) ...it is not clear why the goal of the stormwater design plan is not more in line with the water quality standards in the Stormwater Management Policy for redevelopment projects...more justification is needed for the project goal of only 30 percent TSS removal by 2006.

Response: The Stormwater Management Policy is clearly stated to apply to redevelopment areas. The BMP program for the Muddy River is being applied to almost an entire urban drainage basin where retrofitting is quite difficult. The 30 percent goal significantly extends the life of this project and is consistent with similar BMP programs. This issue is further discussed in Section 7 of the SFEIR.

- 10-27) The drainage design should target for treatment the primary nonpoint sources of the sediment loads to the river from the largest drainage catchment areas and use the most suitable structural and nonstructural best management practices (BMPs). The following facts raise doubt that this has been done:

The FEIR has not isolated the source originations of the sediment baseload;

- Little variation in the proposed treatment of runoff;
- Since land availability restricts the use of other BMPs such as bioretention and sand filters (as suggested by the Center for Watershed Protection), innovative treatment, filtration, infiltration technologies should be considered. Elimination of sediment traps and forebays which provide pretreatment;
- Explain why only 5 sites were selected for structural BMPs, and eliminating 29 sites, and there is limited information to support design selection;
- Structural BMPs, other than particle separators will only treat runoff from 17 acres of the watershed; and
- The plan for using nonstructural BMPs is not specifically associated with sources of higher pollutants.

Response: The BMP plan has been significantly modified in conjunction with CRWA and DEP and addresses the questions raised above in Section 7.

10-28) ...wider use of a variety of BMPs could improve the entire system's effectiveness for capturing and treating a variety of contaminants in runoff.

Response: A wider variety would have provided the capacity to capture additional pollutants. However, after reviewing the BMP program with the proponents and keeping in mind the principal goal of extending the life of the project, the proponent's desire was to concentrate on those BMPs that they have equipment to maintain and experience to operate. This would more likely ensure successful application of the BMPs and meet the goal of sediment reduction. Additional cost comparisons are included in Section 7.

10-29) If an innovative stormwater technology is used which does not have a Strategic Envirotechnology Partnership (STEP) report, the performance capabilities of that technology will need to be demonstrated in accordance with Appendix D in the Stormwater Management Handbook, Volume Two. The pilot program scope for evaluation of particle separators should be reconsidered to ensure that it covers the requirements in Appendix D.

Response: The goal of the Pilot Program for the particle separators is not to develop additional innovation with respect to particle separators beyond what is already approved as part of the STEP process. The program's goal is to be sure that the application of acceptable technology is appropriate under the project design conditions. There may be some applications where the technology is more conservatively applied in order to be sure that the separators are successful.

10-30) ...development will likely be occurring on parcels less than an acre in size, reliance strictly on the NPDES Phase I and II programs to control construction site runoff will most likely not provide meaningful reductions in sediment runoff.

Response: Brookline, where much of the watershed to the Muddy River is located has instituted a more rigorous construction site review procedure that is described in Section 7.

10-31) Given that there are common elements in Phase II requirement for a storm water management program and the "Workplan for Implementation and Maintenance of Basin Wide Non-Structural Best Management Practices (BMPs), it is recommended that the town's management program be reviewed to avoid duplication and to take advantage of opportunities to strengthen both plans.

Response: There clearly are elements in the Phase II program that are also listed as part of the Basin Wide Non-Structural BMPs. Since the responsibility of implementing the program lies with the departments responsible for storm drains, both elements programs will be served and there will not be any duplication of effort.

10-32) Water Management Model (WMM): The relevance of the 2500 cubic yards per year of annual TSS load to the Muddy River Watershed needs

1. Documentation is needed to support the event mean concentrations (EMCs) in Table 5-4...
2. Provide the area of each land use type, AL in Table 5-4.
3. Provide an explanation and/or listing of the conversion factors used to compute the load in cubic yards per year...
4. Reconsideration should be given to the referenced load equation, based on model documentation that multiplies the load factor ML by the acreage, which is different from the computation in the referenced equation.

Response: These issues were specifically discussed with DEP at a meeting to review the information in the FEIR. These comments are specifically addressed in Section 7 of the SFEIR.

10-33) ...The FEIR should have made it clear that CSO load reductions are a reduction of existing CSO loads, given that a 34 percent TSS removal credit has been taken for elimination of CSO load in Stony Brook conduit...

Response: The WMM was used to estimate loadings from the drainage basins contributing to the Muddy River with the exception of the Stony Brook Conduit. A separate evaluation (made for EOEA and BWSC) on the operation of the conduit was used to predict the reduction in flow to the Muddy River based on significant changes in operating conditions. The reduced loadings were not double counted in the WMM. We only took credit for those BMPs implemented in the drainage areas other than Stony Brook and included the changed operation of the Stony Brook conduit as a separate estimate. This is further discussed in Section 7 of the SFEIR.

10-34) The FEIR should have included a table comparable to Tables 5-5 and 5-6 showing the individual annual sediment reduction estimates for each BMP proposed.

Response: These tables have been added in Section 7 of the SFEIR.

10-35) DEP disagrees that "wetlands" cause more sediment loading than parking lots, transportation uses, highway uses, etc.. (See Table 5-4).

Response: Acknowledge comment. Since the land use data source (Mass GIS) did not list any measurable wetlands in the drainage area, the wetland EMC did not really contribute to the runoff in any significant sense. The table has been amended in Section 7.

10-36) The sources of sediment flowing into the river were not specifically identified in the FEIR.

Response: The approximate loading by drainage area is included in Section 7.

10-37) Cleaning of sediments in catch basins is not a source control activity – it is a maintenance activity. The 80% reduction in TSS for twice annual cleaning is not supported by research reviewed by DEP. The DEP stormwater policy presumes a 25% reduction of TSS for deep sumps with cleanings 4 times a year. The cleaning method should also be specified, as vacuuming is more efficient than clamshell buckets. To achieve a more meaningful TSS removal rate, all catch basins should be cleaned a min. 4 times per year, if not more, unless the proponent can quantify the actual loading rate and guarantee sediment be removed prior to each sump becoming half full.

Response: We have not assumed an 80 percent reduction in TSS for twice annually cleaned catch basins as a blanket assessment for catch basin cleaning. However, we have made an attempt to use data developed from the current BWSC study to justify a rational approach to catch basin maintenance and impacts on sediment discharge.

The first piece of information we have used from the BWSC study is that the accumulation rate averages on the order of 12.6 inches per year. This means that in a 4 foot sump, on average, it would take approximately 2 years to reach 50 percent full, which the EPA-600/2-77-051 report concludes is the point when removal rates start to drop off.

Considering that some of the catch basins do not have a 4 foot deep sump, some accumulate faster and therefore may be more than 50 percent full and some basins may be cleaned at proper intervals and have a deep sump. We used the sliding scale to average the impact of catch basins on sediment removal.

The only credit we took on cleaning catch basins was for 177 former MDC basins that are planned to be cleaned once per year but rarely achieve that result. When these basins reach a cleaning every two years approximately 60 cubic yards of sediment will be prevented from reaching the river. We also took credit of 12 cubic yards for about 161 BWSC basins that are cleaned every three years and will average more like every two years under the new management program. Combined, these will result in an additional removal of 72 cubic yards per year over the current practices. This increased removal represents only 6.8 percent of the anticipated load to the 2,722 catch basins in the Muddy River drainage area.

10-38) The 10 percent TSS reduction for street sweeping is only for aggressive street sweeping programs with stabilized land surfaces utilizing high efficiency vacuum sweepers...

Response: Again, we are only anticipating saving an additional 12 cubic yards of material above the 2000 cubic yards annually controlled by street sweeping. This represents only a 0.6 percent increase in efficiency over current practices. The predominant reason for increased efficiency is the increase in frequency of cleaning in several small areas.

10-39) The pilot program for collection of TSS and oil and grease samples must follow the protocol established for Massachusetts through the Technology and Acceptance Reciprocity partnership (TARP) in order for the results to have any scientific meaning. A strict Quality assurance Plan (QAP) must be

stabilized. The QAP must identify the methods used to analyze TSS and oil and grease, and the distribution method to which the data is fit must be identified. The TARP requires 15 storms at a minimum. Winter analysis should not be included.

Response: TARP Demonstration Protocols are followed when manufacturers develop information to prove that innovative technologies are based on solid data for use in design of BMPs. The objective of the BMP Pilot Program is not to push the limits of industry-accepted design criteria, but to collect local data in the Muddy River Watershed that may point to more appropriate applications of the particle separators. Since the objective is not to develop new technologies the number of storms will be reduced to 12 or a full year of data.

The BMP Pilot Program includes a Quality Assurance and Quality Control (QA/QC) Plan to ensure that data from the sampling plan can be used with confidence. Duplicate samples will be collected and analyzed to assess the reproducibility of lab results. The total number of duplicates for each parameter will only be 5 to 10 percent of the total samples collected. To minimize error in the splitting of water quality samples, the “shake and split” method will be used so that the duplicate samples are of a similar nature. Equipment blanks will also be collected to assess whether the sampling equipment contaminates the water quality samples.

10-40) It's DEP's opinion that the source control program will not significantly reduce sediment loads. The program lacked details...it is essential to reduce sediment loading because the structural BMPs proposed may only be efficient at trapping sediments from certain sized storms. Trapped sediments in BMPs may become resuspended and discharge to the Muddy River system given the infrequent maintenance proposed for catch basins and BMPS. More frequent maintenance will result in permanent removal of sediment.

Response: The proposed BMP program took very little credit for sediment reduction as a result of source control programs (only took a small credit for street sweeping). This does not reduce the importance of implementing and following up on this program. Some of the details will necessarily be worked out as the programs are implemented and the proponents have committed to conducting those programs in the SFEIR.

10-41) More elaboration is needed regarding the proposal to “retain stormwater on site.” ...Particle separators typically remove larger sediment fraction and not fines such as silts and clays, and the more often they're cleaned the more efficient they are.

Response: This section described the current BWSC site review controls. For new and re-developed sites BWSC requires that to the maximum extent practical the runoff from the site is controlled during construction and no increase of flow from the site is generated by the construction. The methodology is up to the developer so that the extent of the controls and suitability is dependent on the site and physical limitations.

BWSC requires that all parking lots greater than 7,500 square feet include particle separators and a plan for maintain the structures. Again, these plans and assurances are left up to the

developer to propose and are reviewed on a case by case basis. It does not preclude discharge to the storm water system.

- 10-42) Compile a table of every site evaluated for BMPs and why each site was rejected. Of the 5 sites left, a commitment needs to be made to construct and maintain the treatment systems. More locations for open treatment and sand filter systems should be evaluated.

Response: A table listing all sites considered has been added to the SFEIR in Section 7. A total of 10 specific sites and 23 possible additional separators has been proposed in the SFEIR. As indicated in Response 10.28 the proponents have chosen technologies they feel comfortable implementing with existing equipment and training to ensure a more successful program.

- 10-43) ...DEP recommends that more open treatment systems, sand filters and filter systems be employed and fewer particle separators.

Response: See response to Comment No. 10-28.

- 10-44) The high percentage of sediment removal from repair of the Stony Brook conduit needs to be justified, given that it appears more likely that there is a bacteria reduction, rather than a sediment load reduction.

Response: The calculation of the sediment reduction to the Muddy River is described in greater detail in Section 7 of the SFEIR. The majority of the reduction in sediment load is a result of significantly fewer discharges to the Muddy River from past conditions and also only discharges from the larger storms after the initial sediment load has passed in the conduit.

- 10-45) Rivers maintain channel capacity through bed load erosion of the land over which the river flows...The Muddy River needs to be evaluated to make sure that if sediment loading reductions do occur, that appropriate bed load is still discharged to the river to maintain the channel...

Response: We discussed this issue at a meeting with DEP and agreed that the bed load is more relevant to streams with significantly steeper grades and not influenced by backwater from dams like the Charles River Dam.

- 10-46) The maintenance of the channel, culverts, and stormwater treatment units is general in nature and needs to be further refined...the catch basin cleaning program proposed appears to be in adequate.

Response: The maintenance program for all BMP's has been further refined and is included in Section 7 of the SFEIR.

- 10-47) DEP continues to believe that an alternative project scope that includes Phragmites removal for wetlands enhancement and selected dredging in the Back Bay Fens and Riverway to restore flood flows would be feasible and would accomplish many of the goals of the project.

Response: Additional meetings have been held with DEP to discuss the modifications to the wetlands and dredging and the SFEIR reflects those discussions.

Comment Letter 11

Sarah E. Freeman and Sam Sherwood, 22 Arborway, Jamaica Plain, MA 02130

- 11-1) Disruption of pedestrian and bicycle paths and points of access during construction should be minimized and expeditious return of these structures to public use should be a high priority.

Response: The proponents agree.

- 11-2) Schedule work in Daisy Field to minimize seasonal conflict with the sports schedule.

Response: The staging area originally proposed for Daisy Field has been moved to the old Kelly Rink site to minimize the conflicts with Daisy Field.

- 11-3) Does the plan include drainage and curbs along the Jamaica Way (adjacent to Leverett pond, Willow Pond and Ward's Pond) and the Arborway?

Response: Maintenance of drainage and curbs along the roadways is an important element of the overall park and roadway maintenance. This project includes an initial correction of several specific locations where settlement at the curb and catch basins has resulted in erosion flowing into the park area and ultimately directly into the river.

Comment Letter 12

Friends of the Carlton Street Footbridge (same as Letter 6)

Comment Letter 13

A. Thomas DeMaio, Commissioner of Public Works, Town of Brookline; Antonia Pollak, Acting Commissioner, Boston Park Department, Muddy River Restoration Project

No response required.

Comment Letter 14

Patricia A. Todosco, Executive Director, Boston Greenspace Alliance , 36 Bromfield Street, #201, Boston, MA 02108

- 14-1) The role of the Maintenance and Management Oversight Committee (MMOC) in the maintenance/management structure must be strengthened in order to comply with the Secretary's certificates of decision of an "independent oversight committee."

Response: The role of the MMOC has been strengthened and defined and will be reflected in the MOA for this project.

- 14-2) A detailed Memorandum of Agreement (MOA) needs to be developed describing the public-private partnership management structure.

Response: A draft MOA has been included in the SFEIR.

- 14-3) An annual update to the MMOC is not the best mechanism to evaluate whether prior financial, management and maintenance commitments have been met. The MMOC must have an ongoing and significant role in maintenance/management oversight with the ability to hold the proponents to standards that can be publicly reviewed and discussed...

Response: The role of the MMOC has been strengthened and further defined and will be reflected in the MOA for this project Response.

- 14-4) The proponents have yet to work with Mass. Historical Commission on the very critical issues regarding historical resources.

Response: Through the MMOC and DCR the proponents have met with MHC and expect to work closely with MHC as plans and specifications for this project are developed.

- 14-5) ...join with the ENCAC in asking that a Supplemental EIR be required to address the above concerns, including the development of a detailed MOA.

Response: A draft MOA is included in this SFEIR.

- 14-6) The Alliance is additionally concerned about the current fiscal climate and the effect that budget cuts suffered by the city and state will have on creating more deferred maintenance. How will critical maintenance get done? In the FEIR, the proponents appear not to have addressed the challenge as becoming more substantial with the budget cuts. A fairly large gap already exists between current maintenance practices and the real needs for the future. However, despite the enormous challenges, the proponents must meet their maintenance/management responsibilities.

Response: Additional commitments to the maintenance program is included in the revised Management and Maintenance Plan in the SFEIR as well as progress made in preparing an MOA on management of the project.

Comment Letter 15

Frances Allou Gershwin; Katherine Mathew, Emerald Necklace Citizens Advisory Committee (ENCAC)

The following comments refer to Watershed Evaluation and Best Management Practices

- 15-1) ...We are compelled to recommend that a Supplemental Environmental Impact Report (SEIR) be required...we reach this conclusion primarily but not exclusively because of the inadequate management structure and maintenance plan proposed in Section 6 of the FEIR...

Response: Through a series of cooperative meetings the MMOC and the project partners have agreed upon a proposed cabinet structure. The SFEIR includes a Memorandum of Agreement (MOA) spelling out the maintenance and management obligations of the Proponents, and the role of the MMOC in the maintenance management structure. The MMOC should be a signatory to the MOA along with the proponents, the MDC, and the ENC.

- 15-2) There is still no information about the tracking mechanism for catch basin cleaning, nor any detailed data on the sediment removal rates from either catch basin cleaning or street sweeping. We expected the databases from Boston, Brookline, and the MDC be available for the FEIR.

Response: BWSC has now fully implemented their catch basin tracking program. We have included an example of the catch basin data. At this point there have not been any summary reports produced after implementation of the system since it is quite recent. During preparation of the Annual Update available information will be requested from BWSC.

Brookline has also completed conversion to a new catch basin data base system and is using it to track the progress of the cleaning program. Similarly the information would be included in the Annual Report. [Needs to be confirmed with BWSC and Brookline.]

- 15-3) The FEIR proposes no solution to the ongoing problems with maintenance, data collection and reporting on MDC's storm drains and catch basins. Still no formal process to work with MHD on their BMPs.

Response: A parkway management plan will be included in the SFEIR to set forth DCR's roles and responsibilities

- 15-4) Regular participation of the Muddy River Restoration Project Management and Maintenance Oversight Committee (MMOC) is the best assurance that the BMPs will be implemented and the maintenance done.

Response: Through a series of cooperative meetings the MMOC and the project partners have agreed upon a proposed cabinet structure. The SFEIR includes a Memorandum of Agreement (MOA) spelling out the maintenance and management obligations of the Proponents, and the role of the MMOC in the maintenance management structure. The MMOC should be a signatory to the MOA along with the proponents, the MDC, and the ENC.

- 15-5) The MMOC will need detailed reporting about the ongoing pilot study, and should participate in the planning for the installation of the remaining structural and nonstructural BMPs.

Response: As the pilot study moved through the process the proponents will make the information and expertise needed to evaluate the pilot study available to the MMOC.

- 15-6) The Proponents should make at least quarterly reports to the MMOC on the maintenance of all their existing drains and catch basins that discharge to the Muddy River, effective immediately.

Response: The proponents meet monthly with the MMOC and will provide information as it is requested.

- 15-7) The MMOC should review annual capital and budget plans with Boston and Brookline to ensure that adequate funding will be made available to meet the BMP and maintenance commitments in the FEIR.

Response: The proponents meet monthly with the MMOC and will provide information as it is requested. In addition the MMOC is encouraged to participate in the formulation of budget plans thought the various public meetings held as part of the process in the respective communities.

The following comments refer to management Structure and Maintenance Plan

- 15-8) The proponents have in the FEIR erroneously stated that the ongoing conversations between ENCAC and the Proponents about management structure did not result in a final recommendation. ENCAC delivered its proposed maintenance/management structure to the Proponents on December 23, 2002.

Response: The MMOC and the project partners have agreed upon a proposed cabinet structure. The draft MOA setting the working mechanisms of this cabinet structure are included in this SFEIR.

- 15-9) The proponent's maintenance/management structure does not make room for MMOC as a viable partner in decision-making and oversight ENCAC suggests either the Rowe cabinet structure or our own proposal which would create the appropriate mechanisms for informed discussion, inclusive decision-making and accountability in a true public/private partnership.

Response: The MMOC and the project partners have agreed upon a proposed cabinet structure. The draft MOA setting the working mechanisms of this cabinet structure is included in this SFEIR.

- 15-10) The "Justification for Selection of Public/Private Partnership" (p. 6-12) does not fully explain their lack of responsiveness to the ENCAC's ongoing suggestions for opening up the maintenance/management structure to a broader range of citizens and private sector nonprofit organizations through inclusion of the MMOC in an active and meaningful role.

Response: The MMOC and the project partners have agreed upon a proposed cabinet structure. The draft MOA setting the working mechanisms of this cabinet structure is included in this SFEIR.

- 15-11) The maintenance and management structure in Section 6 of the FEIR does not guarantee the project's long-term success. The model must include an oversight committee.

Response: The MMOC and the project partners have agreed upon a proposed cabinet structure. The draft MOA setting the working mechanisms of this cabinet structure is included in this SFEIR.

- 15-12) The FEIR marginalizes the oversight role of the MMOC and therefore the Proponents are not in compliance with Section 5f of the Draft Record of Decision...

No details accompanies the statement in the FEIR (p. 6-9_ that "the public/private partnership will work through the Environmental Improvements Committee (EIC) to coordinate the maintenance and management efforts...In the Proponent's view, the MMOC is restricted to being the recipient of an "annual update report" (p. 6-11).

The ENCAC finds this unacceptable because: 1) The MMOC is required by the secretary through the Phase One Waiver 2) Citizen participation will ensure an open process and strengthen public support of the project 3) The value of a publicly accessible system of checks and balances for a project of this scope is inestimable.

Response: The MMOC and the project partners have agreed upon a proposed cabinet structure. The draft MOA setting the working mechanisms of this cabinet structure is included in this SFEIR.

- 15-13) The ENCAC recommends that the Proponents be required to prepare an SEIR that includes a Memorandum of Agreement (MOA) spelling out the maintenance and management obligations of the Proponents, and the role of the MMOC in the maintenance management structure. The MMOC should be a signatory to the MOA along with the proponents, the MDC, and the ENC.

Response: Through a series of cooperative meetings the MMOC and the project partners have agreed upon a proposed cabinet structure. The SFEIR includes a Memorandum of Agreement (MOA) spelling out the maintenance and management obligations of the Proponents, and the role of the MMOC in the maintenance management structure. The MMOC should be a signatory to the MOA along with the proponents, the MDC, and the ENC.

- 15-14) A draft of the MOA should be included in the SFEIR. The SFEIR Certificate should specify the minimum provisions that must be included such as:

- Clear and binding commitment to improved stewardship, historic preservation and maintenance of parkland resources and BMPs by Boston, Brookline, and the MDC;
- Inclusion of ENC director and MMOC chair signatories;
- Duties, obligations and responsibilities of each signatory;
- Inclusion of MMOC and ENC representatives as participants in the top level management meetings;
- Schedule of top level management meetings to set up priorities, establish policies, develop and implement programs and to review progress, with titles/positions of required MDC and municipal attendees;
- Clear and binding commitment to coordination and uniformity of parkland maintenance across jurisdictional boundaries;
- Development of performance standards for parkland maintenance with deadlines for adopting standards and an implementation schedule;
- Binding commitment to adequate staffing to implement performance standards and plan to close the projected gap between present and projected FTEs for adequate maintenance;
- Clear and binding commitment to operation and maintenance of BMPs attached;
- Clear commitment to work cooperatively with the MMOC, share information with it, and to fund the MMOC Administrator adequately and in a timely manner each year;
- Enforceable commitment by Brookline to fund and complete the restoration and reopening of the Carlton Street Footbridge;
- Mechanisms for dispute resolution; and
- Boston, Brookline, and MDC reporting obligations to MMOC, EOEA Secretary, ENCA, and Technical Advisory Committee.

Response: A draft MOA is included in the SFEIR. The scope and issues addressed in the MOA have been discussed by the MMOC and a working committee comprised of MOA signatories to ensure all the appropriate issues are included in the agreement.

Historic Resources

- 15-15) The proponents have not adequately addressed a number of issues with relation to the historic character of the park and the impact that this project

will have on historic resources...the proponents must acknowledge that the historic significance of the resource extends beyond individual elements to include historic vistas and the special character of the park...a number of historic issues have not been significantly addresses by the Proponents including the headwall at the Leverett Pond culvert or the islands which need stabilization.

Response: Since the FEIR, the proponents have been working with the MMOC and DCR and met with Massachusetts Historic Commission to address these historic issues and expect to continue to work with MHC as this project proceeds.

15-16) ENCAC is concerned that the project without adequate attention to historic resource issues will not meet the requirement of the MA Historic Commission. Any notice of a change to a historic resource, including the Carlton Street Footbridge, should require a Section 106 finding.

Response: Through the MMOC and DCR the proponents have met with MHC and expect to work closely with MHC as plans and specifications for this project are developed. The current status of the Carlton Street Footbridge is described in Section 10 of the SFEIR.

15-17) The FEIR indicates that 'heritage trees' will be protected, but it does not identify which trees are "heritage trees." The ENCAC believes that all trees in the project area that will remain after completion of the project should be properly protected, and that contractors should be responsible for providing protective fencing. Contractor should also be responsible financially for repairing or replacing any damaged trees as well as other elements of the park project that will impact the historic character of the parks.

Response: Appendix C of the DEIR contains a set of drawings for Inventory and Analysis of Vegetation / Erosion. Heritage trees are identified on this set of drawings and are the resource to use during design to identify and protect trees. The specifications used during the Charlesgate dredging work included direction for protecting trees and also a financial penalty for damage to any tree. There are also contract provisions covering any damage to Owner property that must be repaired or corrected.

15-18) ENCAC is concerned with plans for the future of the MDC parkways that may further divide the control of the resources of the historic parks. Any plan to shift control of the parkways to the MHD should protect them as part of the overall historic resource. The Proponents and the MDC must ensure that roadways bordering the park are given the same care as the parkland itself.

Response: While the parkways are outside of the control of the proponents we have worked with DCR and a parkway management plan has been developed by DCR and is intended to be included in the SFIER.

15-19) The Carlton Street Footbridge remains a significant concern for members of the ENCAC...ENCAC ask that either of two options be considered: 1. Require, as part of the SEIR that the Proponents clarify their legal obligations

in performing their commitments, or 2. Attach a significant financial incentive and/or sanction that will ensure the Proponents do not receive full state funding unless the Town of Brookline commits to the Footbridge restoration and maintenance obligation identified in Table 6-10 for the life of the project. Without one of these actions, we consider the public investment at risk.

Response: The annual update process required by MEPA will provide an opportunity for an ongoing review of the proponents performance as it relates to commitments for the Carlton Street footbridge.

Environmental Mitigation and Section 61 Findings

15-20) Mitigation plans for flood control during construction and an emergency storm response program should be developed and approved by DEP prior to any dredging activities.

Response: These plans are identified in the Section 61 findings and it is anticipated DEP will review these plans.

15-21) A report from the IEM should be made to the ENCAC with the Proponents' annual report. The IEM must work closely with the MMOC to inform their oversight function.

Response: The IEM will work with interested parties to ensure environmental impacts associated with this project are consistent with the permits issued by the appropriate regulatory agency.

15-22) Data should be collected on the effectiveness of the in-stream sedimentation basins. The proposed data collection should be augmented by similar data collection at a nearby part of the river. There should also be data collected before and after a large rain event to see whether the basins actually hold the sediment they collect.

Response: In discussions with the DEP there will no longer be in-stream sedimentation basins as part of the project. Some deepened channel sections will be constructed as maintenance mitigation.

15-23) The MMOC will need to work closely with the Proponents to ensure that maintenance of the in-stream sedimentation basins occurs.

Response: In stream sedimentation basins have been removed from the proposed project. However, the over deepened channel sections will be monitored in accordance with the requirements of the ACOE.

15-24) Plans submitted by the Contractor for construction-related impacts be forwarded to the ENCAC and the MMOC.

Response: THE USACE will be the contracting agency for this project. This request will be forwarded to the ACOE for their consideration.

Comment Letter 16

Isabella M. Callahan, for the Friends of the Muddy River, 107 Queensberry Street, #2, Boston, MA 02215

- 16-1) Opposed to bank to bank dredging on the Riverway. Wants more conservative management of the dredging.

Response: Dredging in the Riverway is necessary in order to remove contaminated sediments from the riverbed for ecological restoration, to remove a source of pollution from being conveyed downstream throughout the river system and to remove impediments to flood flows. The hydraulic dredging method will be used which removes sediment by suction. The sediment slurry will be transported to a dewatering area. Effluent from the dewatering operation will be returned to the river after any necessary treatment and dried sediment is disposed of in accordance with local, state and federal requirements. See Section 5.4.1.2 for a further description of the proposed dredging operation.

- 16-2) Suggests amendment to the Master Plan regarding the proposal to add 3,000+ square feet of asphalt to the Riverway by paving over the present stone dust pedestrian path on the Boston side of the river.

Response: Amendments to the Master Plan are the responsibility of DEM (now DCR) and one of the goals of the new Management and maintenance Plan is for consistent treatment (e.g., materials use, plantings) in the Muddy River area.

- 16-3) Supports restoration of the Carlton Street footbridge.

Response: The SFEIR details a design review process for the Carlton Street Footbridge.

- 16-4) Proponent should secure advice and assistance from the NE Aquarium, the Arnold Arboretum, and Mass. Audubon for the protection of existing wildlife resources.

Response: There has been an extensive consultative period with the appropriate entities.

- 16-5) The FEIR does not address the mountain biking activity near park Drive in the Boston Park Department's facility known as the Back Bay yard. Bikers are eroding the berm used for flood control.

Response: The SFEIR has provided direction on addressing the dirt bike activity. See Section 10.

- 16-6) The Back Bay yard should be restored as a maintenance facility for the Emerald Necklace.

Response: Back Bay yard continues to be a maintenance facility for the Boston Parks and Recreation Department.

Comment Letter 17

Peter C. Webber, Commissioner, Department of Environmental Management,
Southeast Regional Office, P.O. Box 66, South Carver, MA 02366

- 17-1) Flood Proofing of Property – Flood events of higher intensity [than occurred in 1996] will flood the adjacent lands and property owners need to anticipate such events. Property owners need to design new construction or expansion of existing buildings by greater than 50% so as to conform with the National Flood Insurance Standard as found in the Massachusetts State Building Code and applicable City of Boston and the Town of Brookline zoning and building regulations.

Response: This concern will be added in the SFEIR in Section 3.

- 17-2) The removal of debris to and during dredging still needs to be addressed.

Response: In response to this comment and the following comment, we have proposed that additional test pitting in the river be conducted during the design period to both identify debris and cobbles or other characteristics that may impact the use of hydraulic dredging. The methodology to be employed for dealing with debris and cobbles will be dependent on what is found during the testing program.

- 17-3) The additional testing of the physical characteristics of the bottom sediment needs to be done early in the final engineering phase of this project, using electronic equipment or other procedures.

Response: See response to Comment No. 17-2.

- 17-4) The Proponent needs to explore proceeding with dredging geographic area to avoid having the entire riverbank exposed for the entire dredging period.

Response: Control of exposure of the river banks during construction is the key element in preventing erosion runoff during construction. Control of the work and limiting erosion will be addressed in the permitting process with the Conservation Commissions where review of the final plans will identify measures to prevent any undue erosion. This might be accomplished by controlling work by limiting work to geographic areas or by instituting strict erosion control methods that will be sufficient until the permanent vegetation or other erosion control methodology is implemented.

- 17-5) Impact and Mitigation Measures (2.5) and Responses on the DEIR (2.6) are predicted on the assumption that hydraulic dredging will be the method of sediment removal. There is no discussion of whether mechanical dredging needs to be employed.

Response: The need for alternative dredging methodologies is discussed earlier in Section 2 of the FEIR. Sections 2.5 and 2.6 are not strictly related to the dredging methodologies utilized. In both sections where appropriate they impact are acknowledge that cobbles may be present and also alternate dewatering methodologies are considered.

- 17-6) Plans on dredging operation, disposal of materials and methods by which the contractor will control impacts of the dredging operation will also need to be reviewed and approved by the permitting agencies, funding agencies and the Oversight Committee.

Response: The dredging plan will be reviewed and approved by the appropriate entities.

- 17-7) Include discussion on mechanical dredging which most likely will need to be used in sections between Ipswich Street and Wards Pond.

Response: Section 2.3.3 of the FEIR acknowledges that alternate methods of hydraulic dredging (conventional or jetting ring) and mechanical dredging similar to what was used in Charlesgate may still be considered based on the testing completed during design.

- 17-8) The second paragraph on p. 4-11 states that “the overall dredging project is designed to improve the capacity of the river to provide flood control, storm damage prevention. These basins will neither further improve nor diminish the improvement provided by the dredging project and are therefore considered to have a neutral impact on these two interests.” If this is the case, why install the in-stream sedimentation basins at all?

Response: After additional discussions with DEP the in-stream sedimentation basins have been eliminated and the dredging configuration has been modified to be permissible by DEP.

- 17-9) The FEIR does not identify a dedicated funding source nor present a strategy suggesting such a source for land taking and site specific costs associated with the installation of the structural BMPs, the installation of a particle separator to control drainage from the MA Turnpike adjacent to Charlesgate, the recommended increase in street sweeping and catch basin cleaning practices by Boston, Brookline, MDC, MHD, and Newton and the future maintenance of the structural BMPs to ensure effective sediment removal rates.

Response: The SFEIR details a funding strategy in Section Seven for the installation and maintenance of the BMP's associated with this project.

- 17-10) The FEIR does not contain a commitment by the proponents or MDC, MHD, and Newton to undertake the recommended BMPs.

Response: The proponents are committed to implementing the best available BMP's at the time of installation. Section seven of the SFEIR spells out the commitments to the best BMP's currently available. It is the proponents intent to monitor new technologies and methods as they are developed so that the best BMP's are installed to protect the watershed and our investment.

- 17-11) As the pilot study and the BMP watershed study are still underway, the FEIR was not able to include a definitive watershed BMP plan with an engineering, permitting and construction schedule.

Response: *The results of the pilot program have been included in the SFEIR and the BMP program has been made more specific with agreed reductions in sediment loads to the Muddy River. See Section 7.*

- 17-12) The Preferred Management structure as outlined in the FEIR does not appear to meet the requirements of the Secretary's draft and final Record of Decision (dated April 16, 2002 and July 29, 2002, respectively). Both decision documents required implementation of a management structure through the creation of an oversight body representing the stakeholders. The Preferred Public/Private Partnership includes only superficial involvement of the oversight body...the oversight committee must fully participate in the management structure to satisfy the Secretary's requirements ... the Proponents must work to further develop a preferred management structure that allows the oversight body to participate fully in the management responsibilities as required by the Secretary.

Response: *Through a series of cooperative meetings the MMOC and the project partners have agreed upon a proposed cabinet structure. The SFEIR includes a Memorandum of Agreement (MOA) spelling out the maintenance and management obligations of the Proponents, and the role of the MMOC in the maintenance management structure. The MMOC should be a signatory to the MOA along with the proponents, the MDC, and the ENC.*

- 17-13) The Maintenance Plan in the FEIR does not address CEM comments in a letter dated April 8, 2002, nor does it respond to the Secretary's clear direction for revision of the plan as outlined in the DEIR Certificate. Minimum contents of an acceptable maintenance and management plan for the park system must include ... (refer to list in the comment letter)...DEM is available to help the Proponents develop a Maintenance and Management Plan that meets the requirement of the Secretary's Certificate.

Response: *A newly revised management and maintenance plan has been developed using DCR's plan for Maudsley State Park as a model and is included in this SFEIR.*

- 17-14) As for the MEPA Annual Update, DEM recommends that in addition to MEPA and the CAC, the annual report be provided to the Oversight Committee, funding and permitting agencies and noticed on the MEPA Environmental Monitor, and that a mechanism be established for the proponents to take necessary actions to address issues raised in the report and on comments from the CAC and the funding and permitting agencies.

Response: *The proponents will comply with MEPA requirements relative to the annual update.*

- 17-15) ...The Proponents should engage the MMOC's full participation in the numerous unresolved issues related to the maintenance and management.

Response: The MMOC has been so engaged in a rigorous subcommittee process.

- 17-16) It is crucial that the MHD and MBTA be added to the make-up of the MMOC so the interface of planned work by these two transportation agencies within or within the watershed area of the project will be well coordinated with the project as a whole.

Response: The MMOC was established by the Secretary of EOEA and additional members must be appointed by the Secretary.

- 17-17) While the FEIR states (p. 6-18) that "the proponents agreed to accept responsibility for costs of maintaining and managing the project including the implementation of BMPs once Phase I is complete." the FEIR does not provide the level of commitment required in the MOU, the DEIR Certificate, DROD and FROD for Phase 1 Project. Given this lack of commitment, DEM recommends that no additional state funding be transferred for this project until the appropriate level of commitment has been satisfied.

Response: The This level of commitment has been clarified and spelled out in detail in this SFEIR.

- 17-18) DEM recommends, as it did in the DEIR, that Boston and Brookline establish a dedicated maintenance capital trust account to fund the maintenance of the Phase 1 Project...MDC should also seek legislative authorization for the establishment of a similar dedicated funding stream for their share of the required operation and maintenance.

Response: A Management and Maintenance Plan has been included in the SFEIR as well as agreements to negotiate an MOA and MOU covering the management structure and future funding agreements. The draft MOA is included in the SFEIR along with initial comments in the negotiation process.

- 17-19) The Master Plan recommends the preservation of the Carlton Street Footbridge, however the FEIR response gives no indication of a future preservation of the Carlton Street footbridge.

Response: A specific schedule for the design review process associated with the Carlton Street Footbridge is included in the SFEIR.

- 17-20) DEM is alarmed by the Proponents' decision to allow the continued use of the Back Bay Yard Area by dirt bike users which threatens the physical quality of the landscape. The Back Bay Yard Area must be preserved.

Response: A plan has been developed by the Historic Resources Subcommittee, chaired by DCR, and is included in the SFEIR in the historic resources section.

- 17-21) DEM is concerned that with regards to the maintenance of historic resources the operative and only verb used in Section 6.9.4 is “should.” This does not meet the intent of DEM’s DEIR comment recommending the FEIR “must” include mitigation measures to protect the extant historic and cultural resources.

Response: Historic preservation is a fundamental goal of the project. Every effort will be made to preserve and protect historic and cultural resources.

- 17-22) The FEIR comment letter from Division of Fisheries and Wildlife should be used as a guide for fish and wildlife resources.

Response: Comment acknowledged.

- 17-23) Although the FEIR incorporates DEM’s DEIR recommendations on the need for an environmental monitor to insure that the historic and environmental MEPA and permit conditions are fully implemented, it does not meet the requirement of the Secretary’s DEIR Certificate.

Response: In reviewing the DEIR Certificate the only element not specifically provided in the FEIR is the chain of command and authority to stop work. The IEM reports directly to the proponents rather than through the resident engineer. The proponents are the only entity that has the authority to stop work by contractual arrangement with the contractor. The resident engineer does not have that authority. The IEM can not be assigned that authority since they are not the contracting authorities, however the IEM can go directly to the proponent to get the work stopped.

Comment Letter 18

Brookline Town Meeting Members from Precinct One

- 18-1) We wish to go record as voicing our continued opposition to the inclusion of the Carlton Street Footbridge restoration as part of the above-referenced project.

Response: A specific timeline and for design and funding decisions associated with the Carlton Street footbridge is included in section 10 off the SFEIR.

- 18-2) The Town of Brookline, its Selectman and its Town Meeting are pursuing its commitment to study the feasibility of restoring the footbridge. Brookline’s Town Meeting voted on May 29, 2002 to provide an article in a FY04 Warrant that requests that \$30,000 be appropriated in the FY04 CIP for the cost of preliminary plans and other preliminary costs associated with the reconstruction, relocation and removal of the Charlton Street Footbridge, inclusive of mitigation, with provision, in the event of either reconstruction or relocation, for full ADA compliance. The statement in FEIR 7.3.3 misrepresents its intent in an important way, it fails to mention that the

Resolution requests funds from the 2004 budget to explore rehabilitation, removal, and relocation inclusive of mitigation.

Response: A specific timeline and for design and funding decisions associated with the Carlton Street footbridge is included in section 10 off the SFEIR.

- 18-3) The language in FEIR 7.3.3 concerning the results of Brookline's Engineering Department's "cost and feasibility analyses" in 2002-03, should not be construed as meaning that the Engineering Department's findings alone would be the basis for choosing a particular option to be presented at Spring 2003 Town Meeting in a Selectmen's Warrant Article - thereby co-opting the 2002 Town Meeting decision to fund an open and even-handed analysis of the three options from 2004 budget.

Response: A specific timeline and for design and funding decisions associated with the Carlton Street footbridge is included in section 10 off the SFEIR.

- 18-4) Section 7.2, p. 7-1, Volume 1, FIER Main Report states: "Any change in Brookline's commitment to rehabilitate and reopen the footbridge will require, at minimum, the filing of a Notice of Project Change." The Emerald Necklace Master Plan, the 2002 DEIR Certificate and the 2003 FEIR in Section 7.2 acknowledge the Town's option of deciding against rehabilitation by describing the process to be followed should that be the Town's decision. It is certainly clear from the above that the Town is not mandated or contractually bound to restore the footbridge, either by the Master Plan, the DEIR, or the FEIR, contrary to assertions by proponents for restoration.

Response: The current status and commitments to the Charlton Street Footbridge are included in Section 10 of the SFEIR.

Comment Letter 19

Janice Henderson, Senior Planner, Medical Academic and Scientific Community Organization, Inc. (MASCO), 375 Longwood Avenue, Boston, MA 02215

- 19-1) Continue to encourage the proponents to consider all other options than Netherlands Road for siting of equipment.

Response: This comment has been received in the past and we are mindful of the additional impacts this site causes, however there are limited sites in this particular section of the river to consider for staging the dredging. Without this site, we could not pump the dredged material to other sites along the river due to pumping limitations. Even if mechanical dredging methods are used, a dewatering facility must be located in the vicinity of the work and again Netherlands Road is the only reasonable site in this area. Other portions of the project offered alternative sites and these were chosen when they helped resolve conflicting uses. We have included consideration of the traffic impacts in the mitigation section for the Netherlands Road area.

- 19-2) Concerned with scheduling (phasing, timing, and sequencing).

Response: The phasing, timing and sequencing of the project has clearly changed to some extent since the DEIR and FEIR have been published. The involvement of the Army Corps of Engineers for design and construction will by necessity modify the schedule and timing based on their funding cycles. We will endeavor to keep all parties involved in the schedule planning, however the only information we can share at this point is the general schedule shared by the Corps. The intention is to proceed with design of the structures along the river in 2004 and construct those facilities in 2005 followed by the remaining dredging starting in 2006.

19-3) Ensure MDC's roles and responsibilities be committed to by some entity.

Response: DCR has committed to those roles and responsibilities.

19-4) Potential negative impacts on roadways due to lane closures.

Response: As noted in comment 19.1 there will be temporary disruptions for the lane alterations during construction activities. We will be including a requirement for the contractor to prepare a traffic plan as part of the construction submittal in order to limit the impacts of these changes.

19-5) MASCO wants to review construction bid documents before they are disseminated.

Response: If the proponents prepare the construction documents, a public information meeting would be held similar to Charlesgate to obtain comments on the documents.

Comment Letter 20

Michael Frank, President, Jamaica Plain Regan Youth League, P.O. Box 2418, Jamaica Plain, MA 02130

20-1) Reconsider using the former MDC Kelly Skating Rink site as staging area.

Response: The Kelly Rink has been proposed as the staging area for the Leverett Pond, Willow Pond and Wards Pond dredging. See Section 12.

20-2) Reorienting only the northerly diamond would put it too close to the southerly one.

Response: Reorienting the baseball diamond has been dropped from the proposed project plan.

20-3) Design and plant the area around the existing field to prevent infield clay from draining into Leverett Pond.

Response: Any plans for rehabilitation of the Daisy Field area will now be addressed by BPRD and are no longer part of the Muddy River Rehabilitation project.

Comment Letter 21

Hugh Mattison; Frances Shedd-Fisher, Co-Chairs, Friends of Leverett Pond, 209 Pond Avenue, Brookline, MA 02445

- 21-1) Enforcement of accountability, MOU that details non-federal matching funds and establishes a long-term maintenance and management program.

Response: A draft MOA will be included in the SFEIR.

- 21-2) Leverett Pond island shoreline stabilization.

Response: As discussed in the response to comments on the DEIR, the center island in Leverett Pond needs to be reshaped, replanted and the shoreline stabilized since the original rehabilitation was unsuccessful. This is included as part of the project. The landscape architect for the project does not recommend any additional work be done to the remaining two islands other than removing invasives as needed. Work on the two outer islands is also more on the nature of maintenance and can be included on the yearly maintenance plan for the proponent and discussed with the MMOC.

- 21-3) Restore Willow Pond headwall.

Response: This issue was also discussed in the response to comments in the DEIR and recommended that there is no pressing reconstructive work needed although admittedly some maintenance will need to be provided. This work can also be included for consideration in the yearly maintenance items and discussed with the MMOC.

- 21-4) Include details on the maintenance of the Parkways.

Response: A parkway maintenance plan has been developed by DCR and is included as an attachment to the MOA.

Comment Letter 22

Hugh Mattison, 209 Pond Avenue, Brookline, MA 02445

- 22-1) ...there has been no consultation with MHC as specified in the DEIR, which states "The proponents should also consult with MHC regarding the alternatives under consideration for the Carlton Street Footbridge."

Response: Through the MMOC and DCR the proponents have met with MHC and expect to work closely with MHC as plans and specifications for this project are developed. The current status of the Carlton Street Footbridge is described in Section 10 of the SFEIR.

- 22-2) Brookline Town Counsel suggests that the MOU which advanced \$7.1 million from FEMA for Charlesgate dredging only applies to Phase 1 elements, despite the reference to “the Project.”

Response: The project is in Phase 1 of the Emerald Necklace Master Plan.

- 22-3) There has been no leadership in the Town or City to move toward the MHC recommendation of protecting the Carlton Street footbridge.

Response: Through the MMOC and DCR the proponents have met with MHC and expect to work closely with MHC as plans and specifications for this project are developed.

- 22-4) The following flowery language in the FEIR: “the recommendation set forth in the document (ENMP) are intended to provide a framework for decision-making and to lay the groundwork for preserving, rehabilitating and restoring these features”, is in direct conflict with the apparent intent to delay any decision on the future of the Footbridge until the FEIR is accepted.

Response: A specific timeline and for design and funding decisions associated with the Carlton Street footbridge is included in Section 10 off the SFEIR. Through the MMOC and DCR the proponents have met with MHC and expect to work closely with MHC as plans and specifications for this project are developed.

- 22-5) The public deserves the assurance that the Proponents will honor their commitments to the preservation of the Carlton Street Footbridge through the use of a surety bond or other legally enforceable agreement which carries financial penalties for non-performance of both capital improvements and operating and maintenance costs as identified in Table 6-10 of the FEIR.

Response: A specific timeline and for design and funding decisions associated with the Carlton Street footbridge is included in Section 10 off the SFEIR. Through the MMOC and DCR the proponents have met with MHC and expect to work closely with MHC as plans and specifications for this project are developed.

- 22-6) A Supplemental Environmental Impact Report should be required which specifically identifies the actions and schedule the Proponents will follow to preserve historic elements such as the Footbridge.

Response: The SFIER has been prepared and filed.

Comment Letter 23

Kate Bowditch, Chair, Muddy River Restoration Project, Maintenance and Management Oversight Committee (MMOC),

23-1) The Public/Private Partnership between Boston, Brookline, MDC and ENC, does not provide a formal role in the management structure for the MMOC...the proponents must include specific commitments to the MMOC in the MOA and MOU. These commitments should include at a minimum:

1. Regular, ongoing communications between proponents' staff and the MMOC...
2. Coordination between Boston, Brookline, the MDC (or park agency), the ENC and the MMOC for parkland management planning;
3. Coordination between Boston, Brookline, the MDC (or park agency), the TAC and the MMOC on development, implementation and maintenance of BMPs; and
4. Commitments to funding for the MMOC staff position.

Response: The MMOC and the project partners have agreed upon a proposed cabinet structure. The draft MOA setting the working mechanisms of this cabinet structure is included in this SFEIR.

23-2) We ask that MEPA work to identify an appropriate, enforceable mechanism, which will enable the MMOC to function effectively as an oversight body.

Response: The MMOC and the project partners have agreed upon a proposed cabinet structure. The draft MOA setting the working mechanisms of this cabinet structure is included in this SFEIR.

23-3) Commitments to maintenance, and thus the MMOC, must be articulated in the MOU and Moa for the project.

Response: The MMOC and the project partners have agreed upon a proposed cabinet structure. The draft MOA setting the working mechanisms of this cabinet structure is included in this SFEIR.

23-4) The MMOC must be included as the many specific issues to be resolved prior to construction are tackled, such as project phasing, selection of dredging techniques and mitigation, etc.).

Response: The MMOC and the project partners have agreed upon a proposed cabinet structure. The draft MOA setting the working mechanisms of this cabinet structure is included in this SFEIR.

23-5) Plans for both BMP implementation and maintenance, however, are still evolving. The details of the final BMP plan will depend largely on the results of the BMP pilot program, which is still underway. The "measurable environmental performance standards" that were required by the DFEIR Certificate have not yet been developed.

Response: Additional progress has been made in the BMP program in consultation with the MMOC and CRWA and is described in Section 7 of the SFEIR.

23-6) Plans to implement park maintenance plans are outlined in broad generalities
...

Response: Park maintenance plans are included in more detail in the Management and Maintenance Plan in Section 9.

Comment Letter 24

Kate Bowditch, Muddy River Restoration Project, Maintenance and Management Oversight Committee (MMOC), dated April 8, 2003

Letter in support of the project.

Comment Letter 25

Simone Auster, President, The Emerald Necklace Conservancy, Brookline Place, Brookline, MA 02445

25-1) The ENC recommends the formation of a strong public-private partnership as the future management structure for the Emerald Necklace. The ENC would build a partnership with the City of Boston, the Town of Brookline, and the Commonwealth of Massachusetts for the purpose of managing the Emerald Necklace as a unified park system, governed by a Cooperation agreement (MOU) signed by the four parties.

Response: The MMOC and the project partners have agreed upon a proposed cabinet structure. The draft MOA setting the working mechanisms of this cabinet structure is included in this SFEIR.

25-2) The ENC proposes to play the following key roles in the management structure: convener and facilitator, provider of resources, coordinator of consensus building, participant in the public process, and advocate.

Response: The MMOC and the project partners have agreed upon a proposed cabinet structure. The draft MOA setting the working mechanisms of this cabinet structure is included in this SFEIR.

25-3) The MOU should provide for an evaluation process in five years as to how well the management structure is working, and other management options, including a Joint Powers Act entity should be considered, if necessary.

Response: The MMOC and the project partners have agreed upon a proposed cabinet structure. The draft MOA setting the working mechanisms of this cabinet structure is included in this SFEIR.

- 25-4) The ENC encourages the proponents to include the MMOC's Chair in Muddy River Restoration Project-related meeting. However it may not be appropriate for the MMOC Chair to become a formal signatory to an MOA/MOU but rather to have a "seat at the table."

Response: *The MMOC structure will ensure there is always a seat at the table for the MMOC. The proponents will work with the Chair of the MMOC as the project proceeds.*

- 25-5) Monitoring and Maintenance of Historic and Character Defining Features is an aspect of the restored landscape critical to be integrated with baseline maintenance of the site.

Response: *Preservation maintenance techniques have been intertwined into the daily work of maintenance within the park as laid out in the maintenance and management plan.*

- 25-6) The following activities should serve as a framework for preservation maintenance operations and be implemented in relation to the Muddy River Restoration Project:

- Protecting and stabilizing existing landscape features;
- Protecting features from damage;
- Repairing damaged or deteriorated features;
- Maintaining features in their stabilized condition;
- Replacing features with historically and ecologically compatible materials; and
- Perpetuating historic character by selecting materials that support the historic design intent.

Response: *These factors will be utilized when reviewing preservation maintenance operations.*

- 25-7) The ENC look forward to developing maintenance performance standards, plans for improved parks stewardship for both public sector and volunteer, and related activities. The ENC has experience in this area.

Response: *A Management and Maintenance Plan has been included in the SFEIR as a result of the consultation of MMOC and ENC.*

- 25-8) All Project plans, construction, plantings, mitigation, maintenance and related activities must recognize and respond to fact that the Muddy River Restoration Project is more than a flood mitigation project – it is the renewal of waterparks, and green and open spaces of national significance.

Response: All project plans will be consistent with the SFEIR which is an integrated project including all project elements of the park rehabilitation in addition to the flood control elements.

- 25-9) The current and on-going Town of Brookline deliberations on the restoration of the Charlton Street Footbridge should not hold up the issuance of state approval of the Muddy River Restoration Project and state approval of the FEIR.

Response: A specific timeline and for design and funding decisions associated with the Carlton Street footbridge is included in Section 10 off the SFEIR. Through the MMOC and DCR the proponents have met with MHC and expect to work closely with MHC as plans and specifications for this project are developed.

- 25-10) The ENC asks that current and on-going Town of Brookline deliberations on the restoration of the Charlton Street Footbridge not hold up the issuance of state approval of the Muddy River Restoration Project and state approval of the FEIR.

Response: A specific timeline and for design and funding decisions associated with the Carlton Street footbridge is included in Section 10 off the SFEIR. Through the MMOC and DCR the proponents have met with MHC and expect to work closely with MHC as plans and specifications for this project are developed.

- 25-11) A budget should be prepared for all mitigation items identified in Table 10-1 and many other places...

Response: This table includes all of the mitigation for the project. For construction mitigation during construction and immediately post construction the budget is included in the cost estimate for the project and is largely included in the construction bid. For post construction mitigation concerning BMPs and maintenance, the budgets are included as part of the Management and Maintenance Plan in Section 9, Stormwater Management and Maintenance in Appendix C, and BMPs in Section 7.

- 25-12) The project should provide that construction professionals perform a constructability review at various stages of design, including pricing the project as if they were bidding on the project. This should help in providing sound bids and reduce the number of change orders.

Response: This is a sound process for conducting the design and bidding of a project and presuming the project will be designed by the Army Corps of Engineers, they have the construction staff available to conduct these reviews.

- 25-13) As we stated in the DEIR, truck routes need to be further defined, for example, trucks bound for the MassPike Westbound should use the ramp at Newbury Street and not have to go all the way to the Expressway to get to Westbound MassPike.

Response: Truck routes provided in the DEIR were generalized to be sure that there are acceptable routes available to and from the project site. In the case of westbound on the Massachusetts Turnpike the Newbury Street ramp may in fact be a better alternative. The actual truck routes are to be proposed in the contractors traffic plan provided as part of the construction document submittals for review by the Owner. The contractors proposed routes will take into account the actual proposed disposal sites and project work areas.

- 25-14) Since a significant amount of plantings are scheduled, the proponents need to ensure that these plantings will be available when they are required for installation.

Response: Selection of the planting supplier will be the responsibility of the contractor for the project. As was done with Charlesgate, the contractor must identify the supplier and the project landscape architect will visit the supplier to tag acceptable materials for the project. If insufficient materials are available from a single supplier the contractor is responsible for identifying sufficient suppliers to meet the project needs.

- 25-15) The staging of the work is really extended which may add to cost escalations. For example, surface work cannot start until all the dredging is done, as the staging areas are required for the dredging. There may be sections that could be constructed while the dredging is on-going.

Response: The point is well taken that increasing the time for phasing the work can increase the escalation of costs. At this point it appears that the Army Corps of Engineers will be preparing the design and constructing the work and currently their intent is to design the culvert improvements in 2004 and construct them in 2005 while they are designing the remaining dredging elements. The remaining dredging work would begin in 2006. This schedule is as much a function of the Corps decision on packaging the contracts and the Corps resources.

Comment Letter 26

Donna Cohen, President, JP Youth Soccer, 225 Lamartine Street, Jamaica Plain, MA 02130

- 26-1) Reconsider using the former MDC Kelly Skating Rink site as staging area.

Response: The former Kelly Rink has been identified as a staging area for the Olmsted Park dredging. See Section 12 of the SFEIR.

Comment Letter 27

Cara H. Metz, Executive Director, Massachusetts Historical Commission, 220 Morrissey Boulevard, Boston MA 02125

- 27-1) MHC requests more detailed drawings, plans, and technical information on the culverts (requested in April 8, 2002 comment letter) along with specific construction dates of the original culverts and head walls.

Response: This request will be provided to USACE who will be the design and contracting entity for this project.

- 27-2) MHC requests information regarding the pilot study for BMP implementation and maintenance as it becomes available.

Response: Preliminary results of the Pilot Program are included in the SFEIR in Section 7. More complete information and analysis of the data will come when the data gathering is complete in late 2004.

- 27-3) MHC reiterates its request of April 12, 2002 that further documentation and proposed plans for the Carlton Street Footbridge be submitted to MHC as early in the planning stages as possible so that all alternatives for its treatment may be considered.

Response: Through the MMOC and DCR the proponents have met with MHC and expect to work closely with MHC as plans and specifications for this project are developed.

Comment Letter 28

Peter C. Calcaterra, Project Manager, Massachusetts Bay Transportation Authority, 10 Park Plaza, Boston, MA 02116

None of the proposed changes under the planned Urban Ring 2 BRT service will have significant impacts on the Muddy River Preservation Project (EOEA Certificate # 12565).

Comment Letter 29

Noah Luskin, Senior Project Manager, Boston Redevelopment Authority, One City Hall Square, Boston, MA 02201

- 29-1) We recommend the mitigation condition of collecting fish and other aquatic life, including reptiles and amphibians, using electroshock equipment prior to dredging also be included in Table 10-1 of the Section 61 Finding under "Fish and Benthic Resources."

Response: At most locations the active work areas affected by dredging at any time will be small, allowing fish to largely avoid the dredge. Fish communities will improve as a result of the project: see Section 3.5 of the SFEIR.

- 29-2) We recommend that winter dredging be scheduled to avoid those locations where hibernation is likely to occur, as determined by the wildlife biologist.

Response: No dredging shall occur between March 1 and June 15, as described in Table 14-1 of the SFEIR.

- 29-3) If MDC gets eliminated and replaced with the Department of Environmental Management (DEM), then the DEM would become part of the Public/Private

partnership proposed as management structure. This would need to be spelled out in the MOA.

Response: DCR is now the new MDC and as such is involved in the drafting of the MOA for this project.

- 29-4) The proposed construction of new culverts under the Riverway and Brookline Avenue and improvements to the roadway storm drain system need to be coordinated with Potential future improvements to the traffic circulation at Sears Circle.

Response: This request will be provided to USACE who will be the design and contracting entity for this project.

Comment Letter 30

Bryan Glascock, Acting Director, Boston Environment Department

- 30-1) The FEIR does not fully respond to this Department's request in DEIR comments that pervious paving materials be considered for new and reconstructed sidewalks.

Response: There are currently a mix of paving materials in use in the park areas. The new management and organization structure will be trying to unify the treatments used in the park and pervious pavements will be considered in the context of park use and maintenance needs.

- 30-2) The FEIR does not respond to our DEIR comment that, due to the nature of the project, truck routes should be inspected daily and vacuum sweeping employed on City Street and MDC roadways if dredge spoils and other project-related materials have been left behind.

Response: Inspection of the truck routes can be made part of the contract inspection work and the contractor can provide sweeping services to keep these routes free of dredged material. This has been added to the mitigation elements in Section 14.

- 30-3) We request the vibration-prevention plan to be developed by the contractor be supplied to this department, as vibration-related complaints are filed with this office.

Response: Acknowledged, this can be an added distribution of the contractor submittals.

- 30-4) Boston Air Pollution Control Commission (APCC) should be notified when permits are sought from the Inspectional Services Department (SD) for work outside of standard hours.

Response: Acknowledged.

- 30-5) The Boston Conservation Commission (BCC) requests that the proponent and the DEP work with the BCC and the Brookline Conservation Commission to

prepare Notices of Intent for the project in such a manner that will enable the conservation commissions to retain permitting through Order of Conditions for the greatest extent of proposed activities and over the greatest geographical extent of the project as possible.

Response: The project proponents will seek all applicable approvals, as required, from the conservation commissions.

- 30-6) Should variances be necessary for portions of the project, the BCC requests that it have the opportunity to offer construction-phase and perpetual maintenance conditions on how such activities would proceed through the variance procedures established in 310 CMR 10.05.

Response: The proposed Muddy River Flood Control, Water Quality and Habitat Enhancement and Historic Preservation Project, or portions thereof, will not need a variance. It is the proponent's opinion that dredging, environmental restoration, and bank stabilization as parts of the project qualify as a limited project per 310 CMR 10.53(4) which allows projects to proceed that "will improve the natural capacity of a resource area(s) to protect the interests" of the Act, provided the activity does not adversely affect the ability of the resource area to protect the other interests of the Act or result in no change (neutral effect) to the capacity of the resource area to protect the other interests of the Act. Please see Section 5 of this SFEIR for additional detail of work in resource areas and how this work meets the performance standards for a limited project.

- 30-7) Although not proposed, the BLC would like to reiterate its opposition to a cascade system as well as to other new above-ground structures that may be proposed to the Muddy River project.

Response: Comment acknowledged.

- 30-8) The BLC is concerned with the review of BMP development that may affect design and would like to review culvert and headwall designs, plans for laydown areas, dredging techniques and other construction phase activities.

Response: Boston agencies would get to comment on designs through the Parks and Recreation Department's review process. Additionally two public information meetings would be held similar to Charlesgate to accept comments on the project.

Comment Letter 31

Brendan J. Donovan, Director, Brookline Village Action Groups P.O. Box 723,
Brookline Village, MA 021473

- 31-1) The Proponents have failed to detail exactly where the Muddy River overflowed its present floodplain containment and explain the origin of storm waters that supercharged the sewer and drain system and were the real cause of damages.

Response: A hydraulic model was created for the Muddy River and the peak water elevations for flooding in the design storm were presented in Section 4 of the DEIR. The model did not have available detailed contour information to evaluate the exact extent of areal flooding, however comparing the maximum water elevations to the existing ground level information provides a good indication of where flooding occurred. When water elevations increased above the level of storm drain discharges along the river the back up in the storm drains did cause significant damage as noted by the commenter.

The modeling was sufficient to determine the constrictions in the river that contributed to the flood elevations and evaluate possible solutions to reduce the level of flooding. The recommended improvements and anticipated improved water levels were also included in the DEIR in Section 6.

- 31-2) The Proponents omit and ignore the real Historical Value of the river in colonial times and start with the failed 'flushing' of the Fens as proposed by the landscape designer Olmsted, in the late 1800's.

Response: Comment acknowledged. See Section 1 of the SFEIR for a description of the Project's purpose.

- 31-3) Flood wall and dikes are in need of repair and there is no HP access to the T from the park at Longwood stop or bus stop at A spinwall Ave., on Brookline Avenue...

Response: See letter provide as part of response to Comment No. 4-1.

- 31-4) Only one of four brook to river outfalls has an in line oil separating system.

Response: Control of pollutants entering the river is a continuing problem in the Muddy River basin. The non point source control program including education programs and catch basin stenciling programs are aimed at reducing the impact of oil entering the system. Unfortunately, separators located at the end of the discharge points on major storm drains tributary to the Muddy River can be overwhelmed by large storm flows and are often not the most effective way of removing oils from the system. The project proposes several particle separators in several sections of the basins contributing to several of the major outfalls. These particle separators also serve as separators for floatable material, such as oil, and more effectively control the runoff from small portions of the drainage area.

- 31-5) The plan has not improved public safety practices. Past history shows we cannot rely on BMPs.

Response: It is unclear what public safety practices this comment is referring to and how BMPs relate to those practices.

- 31-6) The plan offers no new storm water retention features or dry season flushes...no water quality improvement or wildlife habitat enhancements.

Response: Storm water retention to reduce flooding impacts was investigated as part of the DEIR and by the ACOE in previous studies however no sites of sufficient volume were

available to impact flooding. The DEIR recommends that the proponents as a matter of policy encourage storage of storm water on individual lots where feasible and on new development sites however these policies are not going to provide the storage to impact the design flood storm. The proposed BMP program will remove some suspended solids from the storm water discharges and removing these solids will also remove some other pollutants from storm water discharge.

- 31-7) The Olmsted Plan was negated with the building of the Charles River Dam in 1912 and cannot be restored.

Response: The Charles River Dam significantly modified the flow regime in the Muddy River and the rehabilitation plan while not restoring the original concept uses elements of the original plans to rehabilitate what is possible in the context of the current park configuration and use.

14

Section Fourteen

Section 14

Section 61 Findings/Mitigation

14.1 Introduction

The proposed Muddy River Project is a long-term environmental enhancement and mitigation project that will have some unavoidable short-term construction-related impacts. The mitigation addressed in this section primarily addresses these short-term construction issues, although long-term maintenance and management commitments are also summarized as components that are critical to the longevity of project benefits.

The project consists of the following environmental enhancement and mitigation objectives:

- Provide Flood Control – Maintain the flood elevation in the Riverway at 15 ft. BCB and to remove other flow restrictions;
- Improve Water Quality Improvement – Contribute to the attainment of Class B Water Quality Standards in Muddy River;
- Enhance Aquatic and Riparian Habitat – Increase the size/volume, quality, and diversity of the aquatic and riparian habitat;
- Restore Landscape and Historic Resources – Contribute to the rehabilitation of historic landscape and historic resources while maintaining the Continuum; and
- Institute Best Management Practices for Stormwater Runoff – Reduce the pollutant loading and contribute to the attainment of Class B Water Quality Standards in the Muddy River.

In order to fulfill these objectives, it is necessary that dredging of contaminated sediments be conducted along with some infrastructure improvements. Equally important is the revegetation of aquatic and riparian habitat lands with a diverse composition of wetland, shoreline and upland plantings. The realization of this work will result in an enhanced environmental setting over that which presently exists.

The proposed construction will result in the temporary disturbance of the Muddy River, public uses of portions of the parklands, roadways and pedestrian walkways. The following environmental mitigation measures have been developed to minimize the degree of negative construction-related impacts. There are also a number of measures and plans that are proposed to ensure the long-term benefits of the construction phase of the project. The post-construction implementation plans involve the MEPA Annual Update, a Management and Maintenance Plan (see Section 9), and the implementation of BMPs for stormwater runoff (see Section 7), among others described in this section and in Section 9.

The MEPA Annual Update will be viewed as the compliance report, which will detail the level of compliance with the SFEIR Certificate and the other permits and approvals.

14.2 MEPA Certificate and FEIR Comments

The Secretary's Certificate on the FEIR states that the SFEIR should include Proposed Section 61 Findings for each state agency that must take an Agency Action associated with the project. The SFEIR should include a summary of all mitigation measures to which the proponent has committed, and include details on funding responsibilities and timetables for implementation.

14.3 Draft and Final Records of Decision

14.3.1 Draft Record of Decision

The Draft Record of Decision (DROD), issued on April 16, 2002 by the Secretary of Environmental Affairs, proposed to grant a Phase One Waiver allowing the Charlesgate element of the project to proceed to permitting prior to submission of the FEIR. The DROD set forth six conditions (5a through 5e) for approval of the Charlesgate element of the project as follows:

- 5a. Creation of a workplan and schedule for implementation and maintenance of basin-wide non-structural BMPs;
- 5b. The DEIR does not include detailed discussion of maintenance issues for the Charlesgate element. The workplan needs to expand upon the DEIR treatment of maintenance for the Charlesgate element, and address any permitting requirements of the Metropolitan District Commission;
- 5c. Commitment to completion of basin-wide evaluative studies for potential structural Best Management Practices (BMPs) during calendar year 2002, to ensure that the results of the studies will be fully reflected in the FEIR;
- 5d. To maintain the project schedule described in the DEIR and prevent undue segmentation, the FEIR needs to be submitted to EOEA no later than January 31, 2003;
- 5e. Creation of a dedicated funding source to support the levels of basin-wide BMP implementation and other maintenance measures required to prevent future degradation of the resources and the planned improvements. As suggested by the Town of Brookline, the funding commitment should be evidenced through amendment of the MOU;
- 5f. Implementation of a management structure, through the creation of a permanent independent oversight body, representing the full range of stakeholders. This body should contain at a minimum the following members: Boston and Brookline parks agencies; Metropolitan District Commission (now DCR); EOEA; DEM (now DCR); Emerald Necklace CAC representatives from both communities; Boston and Brookline Greenspace Alliances; Massachusetts Historical Commission; Boston

Landmarks Commission; Brookline Preservation Commission; Emerald Necklace Conservancy; Charles River Watershed Association; and Boston Society of Landscape Architects. The oversight body shall have an independent staff, funded by the proponents.

14.3.2 Response to Draft Record of Decision

All six of the above requirements were addressed by the proponents in letters dated May 21, 2002 and July 1, 2002. Because most of the requirements are pertinent to implementation of subsequent project elements (i.e., beyond Charlesgate), a summary is provided below, with references to other SFEIR sections as appropriate.

- With respect to condition 5a, the proponents prepared a workplan and schedule for implementation and maintenance of the basin-wide non-structural BMPs. BMP maintenance is specifically addressed in Section 7 of this SFEIR.
- To address condition 5b, the City provided copies of the construction specifications for Charlesgate maintenance and the draft permit from MDC (now DCR). The contractor for Charlesgate will provide all park maintenance for two years following acceptance of planted material. It is anticipated that a similar requirement will be made of contractors for subsequent project elements.
- To comply with condition 5c, the proponents included a scope of work describing the study of structural BMPs on a basin-wide basis, including a pilot study of the efficiency of structural BMPs to meet expectations of sediment removal. The results and status of this study are discussed in Section 7 of this SFEIR.
- In response to condition 5d, the proponents filed the FEIR with the CAC by January 31, 2003 (and with MEPA on February 18, 2003) and continue working with the CAC and TAC.
- With respect to condition 5e, both the Brookline Board of Selectmen and the Mayor of Boston submitted letters reiterating their commitment to the project.
- To meet condition 5f, the proponents agreed to support a Maintenance and Management Oversight Committee (MMOC) to facilitate communication and ensure that all project goals are met (see below and Section 8).

14.3.4 Final Record of Decision

In the Final Record of Decision issued on July 29, 2002, the Secretary stated that the proponents met the first five (5a through 5e) of the six requirements, enabling EOEA to issue a waiver for the first element of the project – Charlesgate.

With respect to condition 5a, the Secretary stated that issues involving towing policy should be addressed in the FEIR. With respect to condition 5c, the Secretary indicated that the FEIR should fully evaluate the effectiveness of a wide range of structural BMPs within the Muddy River watershed area. With respect to condition 5f, the Secretary indicated his pleasure that the proponents committed to establishment of an

independent oversight committee, but stated that further discussion of the committee's structure and function is needed in the FEIR. While the Draft ROD envisioned "implementation of a management structure through creation of a permanent independent oversight body," the Final ROD clarified the role of this committee in relation to both existing committees (CAC, TAC) and the proponents. The Final ROD clarified that management responsibilities will remain with the property owners and that the oversight committee "should extend a sufficient time beyond the completion of improvements described in the FEIR (at a minimum five year)" as opposed to being a "permanent body."

14.3.5 Response to Final Record of Decision

In response to the Secretary's comment on towing policy, the Draft EIR calls for enforced car towing. In Brookline, car towing is common during periods when overnight parking is banned, regardless of street sweeping practices. Towing specifically to enhance street sweeping is seldom needed. Boston has taken an increasingly aggressive approach regarding car towing, and enforcement is expected to continue. The Boston Parks and Recreation Department (BPRD) will continue to work with Boston Traffic to improve street sweeping (which incorporates towing).

An update on the status of the proponents' compliance with the Final ROD is summarized in a letter dated November 27, 2002 from the proponents to the MEPA office. The letter identified members of a new independent oversight committee (now called the MMOC), summarized correspondence and meetings (four between October and December 2002) with the members, described the funding strategy for committee staff, and identified a site for staff and meetings. Since that letter was written, there have been further discussions and meetings of the MMOC.

Structural BMPs are addressed in Section 7 of this SFEIR.

The management structure including the MMOC, is discussed in Section 8 of this SFEIR.

14.4 Mitigation Management

Management of the Muddy River Project will include the project proponents (City of Boston and Town of Brookline) as well as the Department of Conservation and Recreation. The Boston Parks and Recreation Department (BPRD) will serve as the contracting agency and will administer the project, that began with the construction contract for Charlesgate. Should the USACE fund the project, the USACE will administer the contract(s) for the major construction contracts (e.g., culverts and dredging). The BPRD, assisted by the Town of Brookline and the Boston Water and Sewer Commission, will administer the construction of structural BMPs as well as minor project elements that are not included in the USACE construction contract(s). As part of this structure, proponents, ENC, proponent's Project Manager, and Resident Inspector will be responsible for managing the contractor's operations and ensuring adherence to contract provisions to mitigate construction impacts. The on-

site Resident Engineer will monitor work and report any deficiencies to the Proponent Administrator for corrective action with the contractor.

To ensure compliance with the requirements of all the project's environmental permits and approvals, an Independent Environmental Monitor (IEM) will be retained by the Project Proponent as part of the on-site inspection team to work with the Resident Engineer. If the USACE performs the project, there may not be permit conditions although the USACE specifications would include typical environmental monitoring and mitigation. In this case the USACE will be responsible for monitoring and meeting conditions in the specifications. The IEM's responsibilities (if provided) will include conducting the environmental inspections (the contractor will conduct the monitoring and submit the results to the IEM), coordinating with Conservation Commissions with jurisdiction, the review agencies, and preparing and submitting the periodic inspection reports. The IEM will report deficiencies to the Proponent Administrator with the Resident Engineer.

The contractor's environmental submittals and data will be reviewed as directed by the management team for compliance with contract documents and permit conditions including mitigation measures.

14.5 Environmental Mitigation for Construction Activities from the Back Bay Fens Through Ward's Pond

14.5.1 Overview

This subsection addresses the mitigation measures that will be implemented to control construction-related impacts. Performance standards and mitigation for construction and post-construction are summarized in Table 14-1. The construction activities will include dredging, daylighting, culvert enlargement and replacement, shoreline stabilization, the placement of muck soil for the establishment of wetland and shoreline plantings and the planting of the wetland, shoreline and upland vegetation, the restoration of historic islands, and other activities for the preservation of historic features of the Emerald Necklace.

The following plans will be submitted by the contractor, and will reference appropriate mitigation commitments. Each plan will be reviewed and accepted by the proponents prior to construction.

- Dredged Material Plan
- Stormwater/Dewatering Pollution Prevention Plan
- Environmental Monitoring and Sampling Plan
- Plan for Monitoring of Wetland, Shoreline and Landscape Restoration
- Pest Control Plan
- Traffic Management Plan
- Transportation and Disposal Plan
- Plan for Monitoring of the Three Spine Stickleback
- Public Outreach Program

Table 14-1
Muddy River Environmental Standards Mitigation

Environmental Issue	Performance Standards/Mitigation	Reports/Plans Referencing Performance Standard/Mitigation*
General	DURING CONSTRUCTION:	
	1. Onsite environmental inspector will keep a daily log summarizing all construction and restoration activities of the project, noting turbidity conditions, sampling results, extent of sediment plume, occurrence of fish kills, and evaluation of various measures employed to reduce turbidity and other impacts to water or wetlands. Submit weekly report to Conservation Commission.	Environmental Inspection Report
	2. Street sweeping and dust control.	Environmental Inspection Report
	POST-CONSTRUCTION:	
	1. MOU committing to funding project maintenance	MOU
	2. Quality assurance program through reports and logs to document maintenance activities	Maintenance Operations Plans
	3. Provide annual updates to MEPA.	MEPA Annual Updates
	4. Certain activities to be accomplished each year will require permitting where state agencies can provide guidance on future activities	Permit applications or amendment requests
Sediment Removal and Management	DURING CONSTRUCTION:	
	1. Staging areas will be lined and runoff will be collected and treated before being discharged. Staging areas will be tested before restoration.	Supplemental Sampling of Sediment (as needed); Dredged Material Plan
	2. Dewater sediment prior to trucking. Sediment shall contain no free-draining liquids. Use Paint Filter Test, EPA Method 9095 to determine this when questionable.	
	3. Lime and foam will be provided on site at all times for odor control as needed.	Dredged Material Plan
	4. The contractor will submit MSD sheets for polymers and other products proposed for use. Use of toxic materials will not be approved.	Sediment Removal and Shipping Record
	5. TC-Lead sediments will be treated, tested and stored on site in containers prior to trucking off site for reuse or disposal.	
	6. Contractor shall submit proposed reuse or disposal facilities for review and approval by the engineer.	
	7. Cover sediment during transport by a tarpaulin or other means.	
	8. Sediment shall be accompanied to the landfill by a DEP Material Shipping Record	
	POST-CONSTRUCTION:	
	1. Same requirements for maintenance dredging as for sediment removal during initial dredging	Supplemental Sampling of Sediment (as needed); Sediment Removal and Shipping Record; Dredged Material Plan
Erosion Control	DURING CONSTRUCTION:	
	1. All landside unconsolidated, project-related materials shall be contained to prevent erosion by all practical methods, including but not limited to double-staked haybales and silt fence	Environmental Inspection Report; SWPPP; Maintenance Plan for Filter Fabric
	2. Stockpiles shall be completely covered when no activity occurs at the site for periods greater than 24 hrs	Environmental Inspection Report; SWPPP
	3. Staked silt fence and hay bale line shall enclose the entire work site, including the excavation area, stockpile area and frac tank area	Environmental Inspection Report; SWPPP
	4. Inspect barriers on a daily basis and maintain them as necessary	Environmental Inspection Report; SWPPP

Table 14-1
Muddy River Environmental Standards Mitigation

Environmental Issue	Performance Standards/Mitigation	Reports/Plans Referencing Performance Standard/Mitigation *
Erosion Control (cont.)	5. All landside disturbed areas shall be stabilized as soon as possible after construction is complete. Landward of mean high water and wetlands buffer zone, disturbed resource areas shall be secured by biodegradable erosion control mats while vegetation establishes	Environmental Inspection Report; SWPPP; Maintenance Plan for Filter Fabric
	6. If soils are disturbed >30 days, a temporary cover of rye or other grass shall be established. If the season is not appropriate for plant growth, exposed surfaces shall be stabilized by straw, snow fence or other NRCS recommended methods.	Environmental Inspection Report; SWPPP
	7. Use automatic wheel washing facility at staging areas to minimize offsite sediment transport.	Environmental Inspection Report; Dust Control Plan
	8. Implement street-sweeping using a wet-vac unit	Environmental Inspection Report; Dust Control Plan
	9. Provide stabilized entrance to staging areas	Environmental Inspection Report; Dust Control Plan
	POST-CONSTRUCTION:	
	1. Identify erosion on a frequent basis. Stabilize eroded areas as soon as possible with plantings and turf.	Maintenance Logs
	2. Before and immediately following large storms (expected to exceed 4 inches in 24 hours), staff will walk along the river doing visual inspections and removing debris from culverts and bridge openings as well as from drains or catch basins	Maintenance Logs
	3. Correction of eroded stream banks and pedestrian trails following storms of large magnitude to prevent further erosion.	Maintenance Logs
Water Quality	DURING CONSTRUCTION:	
	1. Continuous turbidity monitoring 200 ft upstream and downstream	Water Quality Monitoring and Analytical Results
	2. Weekly collection of water samples to be analyzed for TPHs, total and dissolved lead (dissolved lead shall be less than 1.0 micrograms/l, a site-specific, chronic, water quality criteria based on 40 mg CaCO3/l measured at the nearest sampling location)	Water Quality Monitoring and Analytical Results
	3. Weekly measurements of water temp, pH, and DO	Water Quality Monitoring and Analytical Results
	4. Weekly sampling of filtrate for analysis of TSS, total and dissolved lead, and DO. To be suitable for discharge, filtrate shall have a TSS < 40 mg/l, dissolved lead < 1.0 micrograms/l, and a minimum DO of at least 5 mg/l. Filtrate shall be discharge into the Muddy River within a silt-curtained enclosure equipped with an oil-absorbent boom	Water Quality Monitoring and Analytical Results
	5. A request for 36-hr turnaround time for lab analysis of samples.	Water Quality Monitoring and Analytical Results
	6. Minimize turbidity and other water quality impacts by using a floating boom with attached silt curtain and oil absorbent boom	Water Quality Monitoring and Analytical Results
	7. Maintain silt curtain in good operating condition, rest it on the mudline at all times, and secure it to a seawall.	Water Quality Monitoring and Analytical Results
	POST-CONSTRUCTION:	
	1. Conduct annual water quality sampling consisting of quarterly (seasonal) sampling events at specified areas along the river and at drainage outfalls. During each quarter, water quality samples will be collected during a dry period, during precipitation, and the day following precipitation event. Sample for fecal coliform, fecal streptococcus coliform, TSS, true and apparent color, total phosphorus, orthophosphate phosphorus, turbidity, alkalinity, acidity, ammonia nitrogen, nitrate-nitrite nitrogen, metals, TPH-EPH. Data will be used to monitor water quality as related to meeting DEP Class B waters.	Water Quality Monitoring Program

Table 14-1
Muddy River Environmental Standards Mitigation

Environmental Issue	Performance Standards/Mitigation	Reports/Plans Referencing Performance Standard/Mitigation *
Wetland and Upland Plantings	DURING CONSTRUCTION: 1. Protect mature upland trees and shrubs (except Japanese knotweed) within and adjacent to project areas to their drip lines.	Environmental Inspection Report
	POST-CONSTRUCTION: 1. Contractor shall be responsible for successful restoration of disturbed areas for 2 years after construction. After 2-year period, proponents are responsible.	Report on Plantings
	2. Report on plants one, three, and five years after planting to assess success and adjust planting effort as necessary.	Report on Plantings
	3. Once inspection program is established, continue on a three-year cycle and report in MEPA Annual Update.	Report on Plantings
	4. Monitor and control success rate for controlling invasives by documenting where they have started regrowing 3 times per year. As needed, control by cutting, hand application of state-approved herbicides, and hand removal (note: experienced contractors will be used for herbicide control)	Report on Plantings
	5. Watering, pruning, fertilizing, mulching, pest control, winter protection, use of ground covers, and integrated pest management will be performed on a regular basis.	Report on Plantings; Pest Control Programs
Fish and Benthic Resources (including Rare Species)	DURING CONSTRUCTION: 1. No dredging shall occur between March 1 and June 15 of any year to protect migration of river herring, rainbow smelt and blueback herring	Environmental Inspection Report
	2. Fisheries biologist to inspect temporary holding pool of three-spine stickleback and report monthly to IEM.	Environmental Inspection Report
	3. IEM to oversee capture and transfer of sticklebacks, inspect viability of population, and oversee return of holding pool population to Willow Pond	Environmental Inspection Report
	POST-CONSTRUCTION: 1. Biologist will visit the site several times in the early and late growing seasons to document wildlife use of the habitat.	Report on Aquatic and Wildlife Distribution
	2. Monitor three-spine stickleback viability in Willow and Spring Ponds for 2 years following construction.	Report on Aquatic and Wildlife Distribution
	3. Inspect integrity of banks around Spring and Willow Ponds annually	Annual Report
	4. Inspect condition of shelf area and berm at the inlet to Willow Pond annually	Annual Report
	5. Note and report any Stickleback mortalities annually.	Annual Report
Wildlife Resources	POST-CONSTRUCTION: 1. Pest and rodent control through public education; local ordinances against feeding ducks and geese; planting of suitable species to form a barrier between water and land; and implementation of reproductive control on goose population by state and federal game officials.	Pest Control Programs
	2. Biologist will visit the site several times in the early and late growing seasons to document wildlife use of the habitat.	Report on Aquatic and Wildlife Distribution
Flood Control	DURING CONSTRUCTION: 1. In the event of a significant storm, operations to maintain river flow will be implemented.	Dredged Material Plan

Table 14-1
Muddy River Environmental Standards Mitigation

Environmental Issue	Performance Standards/Mitigation	Reports/Plans Referencing Performance Standard/Mitigation *
Culvert Maintenance	POST-CONSTRUCTION: 1. Conduct preventative inspections prior to major storms and twice per year outside specific storms. Clear blockages. 2. Inspect culverts once per year for structural conditions (crack, erosion, settlement). 3. Ensure annual review of operating policy for Boston Gatehouse #1.	BMP Monitoring and Maintenance Logs BMP Monitoring and Maintenance Logs BMP Monitoring and Maintenance Logs
Source Control and Treatment Control BMPs	POST-CONSTRUCTION: 1. Update database continuously regarding new construction, location, structural integrity and sediment deposition rate for each catch basin 2. Maintain street sweeping programs. 3. Replant grass and vegetation every spring or fall along desire lines 4. Ongoing public education to ensure current and future residents are informed about herbicide and pesticide use management, proper disposal of litter, pet wastes, and household hazardous materials 5. For vegetated swales, regular mowing of the grass, no shorter than twice the design flow depth (typically 4-6 inches) 6. Inspect swales monthly to check for inlet plugging and signs of erosion. If erosion is occurring, stabilize eroded side slopes and/or bottom. Keep swales free of debris. Reseed damaged areas as soon as possible. Also dethatch swale bottom; thatch, disc or aerate swale bottom; nutrient and pesticide use management. Every 5 years scrape swale bottoms and remove sediment to restore cross-section and infiltration rate. 7. For particle separators, conduct seasonal inspections for the first year of operation to establish appropriate maintenance schedule. Thereafter, clean system annually depending on weather and site activity; however, cleaning just prior to winter salting and sanding is recommended. 8. Maintain catch basin cleaning programs. 9. Monitor sand bar formation every year in sedimentation basins. Programming for maintenance dredging should be started when sedimentation has accumulated to about 50% of the basin's initial capacity. Measure basin shapes and depths at the end of construction. Once per year, set up a grid to measure sediment depths at each basin and estimate remaining basin volume.	BMP Monitoring and Maintenance Logs BMP Monitoring and Maintenance Logs BMP Monitoring and Maintenance Logs Maintenance Logs Maintenance Logs BMP Monitoring and Maintenance Logs BMP Monitoring and Maintenance Logs BMP Monitoring and Maintenance Logs
Noise Control	DURING CONSTRUCTION: 1. Comply with noise ordinances 2. Measure noise levels at Brookline Ave. culvert 3. Noise abatement provided on construction equipment	Environmental Inspection Report Environmental Inspection Report Environmental Inspection Report
Pest Control	DURING CONSTRUCTION: 1. Certified pest control specialist to conduct weekly inspection and file reports regarding control efforts	Pest Control Plan
Traffic Management	DURING CONSTRUCTION: 1. Police supervision for equipment mobilization to/from staging areas 2. One-lane closures only (or at night) 3. Follow designated haul routes 4. Limited contractor parking (no more than 6 spaces for RE, inspectors, mgt personnel). No travel lanes will be blocked for parking. Encourage carpooling. 5. Full restoration of sidewalks and paths	Traffic Management Plan Traffic Management Plan Traffic Management Plan Traffic Management Plan Traffic Management Plan

* Primary document referencing and/or reporting on the performance standard

14.5.2 Dredged Material Plan

The sediments to be dredged have been characterized to determine the appropriate management activities for their removal from the Muddy River, dewatering, and ultimate disposal. The quality of the sediment varies. In some locations, and within short distances, sediment that meets the DEP's unlined landfill criteria can be adjacent to TCLP toxic sediments. Each of these conditions requires different management actions. Therefore, in order that the contractor states its plans for the proper management of such materials, the contractor will be required to submit a Dredged Material Plan. The Plan will be the contractor's commitment for environmental compliance and will contain the following information:

- Project Objectives
- Existing Sediment Quality
- Existing Water Quality
- Existing Aquatic, Wetland, and Upland Biological Resources
- Historical and Architectural Resources
- Structural and Geographic Limitations to Dredging, Equipment, and Materials Management
- Dredged Materials Management
 - Proposed Dredging Methods
 - Hydraulic
 - Excavator
 - Dredging Equipment and Performance Criteria
 - Compatibility of the Dredging Equipment with the Disposal Methodology
 - Dredging Sequence
 - Dewatering and Sediment Stabilization
 - Water Quality Mitigation Measures during Removal of the *Phragmites* Root Mass and Hydraulic Dredging, Siltation Control
- Upland Support Requirements, Staging Areas
- Operational Controls
 - Traffic Management
 - Truck Queuing and Engine Idling Restrictions
- Pedestrian Movement
- Trash and Debris Removal
- Noise Control (including vibration)
- Dust Control
- Odor Control
- Repair of Damaged Landscaping and Vegetation
- Schedule
- Mobilization
- Regulatory Requirements
- Water Quality Monitoring
- Parkland Monitoring
- Contingency Plan In the Event That Uncontrollable Environmental Problems Occur
- Emergency Response Plan and a Spill Prevention Control Containment and Countermeasure Plan (Title 29 CFR 1910.120 of OSHA Standards, 40 CFR 112,

FEMA Emergency Plan Requirements, Section 105 of CERCLA, Massachusetts Right-to-Know Act and other local, state and federal requirements, as appropriate).

At space-limited locations where dredging with excavators will be necessary, the area will be enclosed with a silt curtain to prevent the downstream spread of turbid water and its potential flow into the Charles River. A silt curtain will also be maintained at the conduit under Storrow Drive to prevent floating debris and sheens from entering the Charles River. Oil absorbent materials will be maintained at the booms. The silt curtain and absorbent materials will be inspected daily. Accumulated debris and trash will be removed daily and the absorbent pads will be replaced as needed.

The Dredged Material Plan will address dust control including such measures as:

- Use of automatic wheel washing facility at staging areas to minimize offsite sediment transport;
- Implementation of street-sweeping using a wet-vacuum unit; and
- Provisions to provide a stabilized entrance to staging areas.

The Dredged Material Plan will be submitted by the contractor for review and acceptance and will also be provided to Yvonne Unger at DEP, in compliance with the anticipated 401 Water Quality Certification.

14.5.3 Stormwater/Dewatering Pollution Prevention Plan

It is anticipated that the contractor will form staging areas by placing a 4-mil HDPE liner with layers of sand and crushed stone over the existing ground. As such, the underlying soil will remain essentially undisturbed and will not be subject to erosion. Runoff from staging areas will be directed to sedimentation/infiltration basins and/or grassy swales. These measures are very effective at treating runoff, and discharge of sediment or contaminants into surface waters will be minimal. Each staging area for dredging will contain sedimentation tanks, pumps, coagulant polymer feed systems, belt filter presses, water filters, conveyor belts for truck loading, a field office, and limited construction personnel parking (no more than 6 spaces for Resident Engineer, inspectors, contractors, and management personnel). Staging areas not used for dredging will include trailers and materials staging for contractor's work. All work will be conducted from the staging areas. Truck queuing will take place off-site. More intense typical construction activities will occur at the Fens Bridge and former Sears parking lot sites due to the large amount of excavation, rip-rapping, grading, and plantings that are necessary for the daylighting and culvert enlargement. In addition, at the former Sears parking lot, piles will have to be driven to form the foundation for the arch culvert.

The staging area runoff will be contained by the use of silt fences and hay bales. The contractor will be required to provide a stabilized entrance to the staging area equipped with a wheel wash in order to prevent tracking of soil and dust onto local streets. Water from the wheel wash will be detained in a sedimentation tank for

settling before being discharged to the Muddy River. Regular street sweeping and other construction BMPs (such as use of calcium chloride to reduce dust) also will be required to control runoff from construction areas. The condition of the erosion controls and the streets will be inspected and documented daily.

Prior to final approval by the Department of Environmental Protection (DEP) and the Boston and Brookline Conservation Commissions, the contractor will be required to submit a Stormwater/Dewatering Pollution Prevention Plan (S/DPPP). The S/DPPP will contain an Erosion and Sedimentation Control Plan and a Spill Prevention Control, Containment and Countermeasure Plan that would be specific and applicable to each staging area. The S/DPPP will be developed to avoid and minimize potential adverse effects on water quality. The plan will address erosion and sedimentation control, wastewater treatment, and water quality monitoring. These plans will state the contractor's intent for managing site runoff, monitoring, and maintenance.

As work is completed in the sections of the Muddy River being served by a staging area, the site will be restored and revegetated as shown in the Preliminary Design Report (see Appendix I of the Draft EIR). If the staging areas are to be used in subsequent construction there may only be a temporary stabilization until work in the staging area is complete. During restoration, erosion control measures will be maintained as removal of work surface could lead to additional erosion.

Weekly Environmental Inspection Reports that contain the results of the site inspections, the progress of the work, anticipated work for the following week, the results of water quality monitoring and other pertinent details will be submitted to the proponents, DEP, USACE (if involved), and both Conservation Commissions, as appropriate.

On an as-needed basis, site walks with representatives of DEP, the USACE, and both Conservation Commissions will take place to review on-ground conditions.

14.5.4 Environmental Inspection Report

The potential for short-term water quality impacts will be present wherever dredging and earthwork is undertaken. In order to be able to take appropriate measures to minimize unanticipated water quality disturbance, monitoring of the Muddy River will continue through all phases of construction, plus two years following the stabilization of the restored ground and banks. The construction period water quality monitoring will be in addition to the Muddy River Water Quality Monitoring Program that will take place before, during, and after construction has been completed. (see Section 9 - Management and Maintenance Plan).

Construction water quality monitoring will include the following:

1. Continuous monitoring of suspended solids with appropriate meters, 200 feet upstream and 200 feet downstream of the discharge of dewatering pressate;

2. Weekly monitoring of all discharges from sedimentation tanks, dredged material dewatering equipment, and the Muddy River upstream and downstream of the dredging operation(s). Water samples will be collected and analyzed for:
 - Temperature (field test)
 - Dissolved Oxygen (field test)
 - pH (field test)
 - Total Petroleum Hydrocarbons (laboratory test)
 - Total Lead (laboratory test)
 - Dissolved Lead (laboratory test)
3. The monitoring results will be attached to a weekly BMP Inspection Report (see S/DPPP) that is submitted to the DEP and the Boston and Brookline Conservation Commissions.

14.5.5 Parkland Monitoring

To ensure that the contractor's activities and equipment remain within the allowed construction limits, the final design plans will contain specifically marked limits of construction. These limits of construction will be prepared by the engineer and landscape architect and will be placed such that the necessary entry into parkland does not adversely impact sensitive vegetation, heritage trees and historic features, nor lead to adverse water quality impacts. During construction, the IEM will monitor the contractor's activities to ensure that the work remains within the designated limits of construction.

14.5.6 Plan for the Monitoring of Wetland, Shoreline, and Landscape Restoration

The purpose of the Plan for the Monitoring of Wetland, Shoreline, and Landscape Restoration is to ensure the rapid discovery of developing concerns, whether it is erosion or die-off of vegetation, and the equally rapid correction. The contractor will be responsible for the restoration of all disturbed areas including, but not limited to, staging areas, access points, shorelines, and other areas that were disturbed by construction and restoration activities. The contractor will provide a qualified horticulturist/arborist, and Certified Wetland Scientist to conduct weekly inspections during construction progress of the bank stabilization and the planting of wetland, shoreline and upland vegetation. The inspections will be conducted with the Resident Engineer or designee. Inspections may also be conducted with the DEP, and the Conservation Commissions as required. Noted exceptions and areas of concern will be corrected within one week or sooner, if the Resident Engineer or regulatory authority deem necessary. The contractor will provide Inspection Reports, which contain maps of the plant beds, field notes and logs describing the corrective measures that were taken, if any, and quantities of materials that were used, as well as locations where they were applied. The contractor will provide a two-year guarantee for the success of the soil stabilization and all plantings.

14.5.7 Pest Control

The stands of *Phragmites* throughout the project area and adjacent areas (i.e. Back Bay Fens near the Victory Gardens and the Fire Alarm Headquarters/Boston Emergency Management Office) contain rats, muskrats and other rodents. In order to prevent the displacement of rodents to adjacent areas where they may become a nuisance to park users and area residences, the contractor will conduct a program to control rodents within the Project Limits. The contractor will conduct the rodent control program in a cooperative manner with the interest groups that operate within the Emerald Necklace Parks. Positive steps will be taken to ensure the safety of pets from the baits. The contractor will employ a pest control supervisor who is licensed and certified by the Massachusetts Pesticide Bureau in General Pest Control (Category 41) and Vertebrate Pest Control (Category 44). Weekly inspection/survey reports will be filed with the Resident Engineer showing locations of bait stations, the amount of bait used, conclusions and recommendations.

14.5.8 Public Outreach Program

Throughout the course of the construction period there will be a regular outreach program in order to keep abutters informed of the progress of the work as well as the upcoming schedule. Public Meetings will be held regularly to allow for the opportunity for discussing issues during and following the construction period. The meetings will also allow for the opportunity for the expression of problems and/or concerns during and following the construction period. The Resident Engineer will provide regular, timely updates to the proponent for release to the local media.

The proponents also plan to provide descriptive boards and signage describing the project and the ongoing work as part of the program to keep the public informed.

14.5.9 Traffic Management Plan

The following traffic- related mitigation is proposed:

- Equipment mobilization to/from the staging areas and the areas of culvert construction will require police supervision as a safety precaution. For trucks entering and exiting the staging area where a sidewalk crossing occurs, the contractor will be required to provide a ground guide.
- Culvert construction across The Riverway will require lane closures and will be restricted to no more than one-lane closure at a time. Signal timing adjustments will be needed at several intersections through the Sears Rotary as a result of these lane closures.
- When construction of the Brookline Avenue culvert (at former Sears parking lot) is within the existing traveled way, lane closures cannot occur during daylight, so work will take place at night. Night work will allow lane closure and/or construction of temporary lanes to expedite work. Contractor will be required to replace a bridging slab over the roadway so all lanes in the traveled way will reopen during the day.

- Work at the Brookline Avenue culvert will be considered for daylight weekend work during lower traffic times except when it conflicts with baseball games or major institution functions in the area that would generate excess weekend traffic.
- Contractors must be required to follow the designated truck haul routes. This will help minimize truck traffic on residential roadways not appropriate for truck traffic.
- Truck queuing will not be allowed on local roads and side streets. The Contractor will provide for an off-site truck queuing location and radio control.
- State law, the City of Boston's ordinance and Town of Brookline's Noise Bylaw regarding idling of truck engines will be enforced.
- All sidewalks and paths will be fully restored once construction activity has ended.
- Limited contractor parking (no more than 6 spaces for Resident Engineer, Inspectors, Management personnel) will be provided either within the bounds of an active staging area or off-site (at a location to be determined). At no time will contractors be allowed to block a travel lane for parking. A carpooling plan is strongly encouraged, whereby only one or two contractor vehicles are parked within the staging area and other vehicles are off-site.
- Pedestrian access on Netherlands Road and Agassiz Road will be maintained while these roads are temporarily closed and used as staging areas for construction equipment.
- At the intersection of The Riverway at Brookline Avenue, there are existing capacity deficiencies that are expected to be exacerbated while Netherlands Road is closed and used as a staging area. The predominant level-of-service and delay degradation is expected to occur to the left-turning movements from Brookline Avenue onto The Riverway. The following mitigation should be considered to alleviate these impacts
- Redesignate The Riverway northbound at Brookline Avenue approach right-turn only lane as a shared through/right-turn lane. This will require modification to the signal phasing.
- Consider upgrading the traffic signal equipment and providing an exclusive left-turn phase for both eastbound and westbound traffic on Brookline Avenue (currently, the westbound approach has a short lead phase).
- The Resident Engineer will regularly coordinate with other local businesses and organizations which impact traffic such as Fenway Park, MASCO, Emmanuel College, etc.

14.5.10 Habitat Protection, Mitigation, and Enhancement for the Three Spine Stickleback

As discussed in Section 11, the Three Spine Stickleback, a threatened species of fish listed by the Massachusetts Natural Heritage Program, inhabits Spring Pond, its outlet stream and a small area at the inlet of Willow Pond. A one and one-half to two foot high stone dam that is in need of repair separates Spring Pond from Willow Pond. Spring Pond is kept considerably cooler than Willow Pond by the discharge of groundwater into the Spring Pond. Willow Pond also has watercress and a small amount of filamentous algae growing in it.

The proposed project elements at Willow Pond were discussed with the Natural Heritage Program staff, reviewed in the field and further discussed in telephone conversations. Through these and other efforts, opportunities were observed where the habitat conditions for the Three Spine Stickleback can be protected as well as enhanced. The Natural Heritage Program requested that a habitat protection, mitigation and enhancement effort be conducted. The protection, mitigation, and enhancement effort which will be conducted by the contractor, will be coordinated with the Natural Heritage Program staff and includes the following:

- Capture of Sticklebacks inhabiting the inlet to Willow Pond below the Spring Pond dam and relocating them to a temporary holding pool;
- Restoration of the historic Willow Pond capacity by dredging 5,900 cy sediment;
- Removal of invasive vegetation around Willow Pond;
- Preservation of the shelf habitat of the Stickleback in Willow Pond with sediment curtains and sheeting;
- Addition of a small gravel berm at the edge of the shelf habitat to define the outer edge of the Stickleback pool in Willow Pond;
- Installation of a water level controlling discharge pipe in Willow Pond;
- Creation of a small pool or settling area for Sticklebacks temporarily relocated from Willow Pond;
- Preservation of the historic park features at Willow Pond by revegetation of the new bank, reintroduction of an island in Willow Pond, and establishment of wetland areas and restoration of terrestrial habitat with indigenous plantings;
- Control of sedimentation that is entering Spring Pond from the adjacent bank and pathways; and
- Reconstruction of the stone dam between Willow Pond and Spring Pond.

Further information is provided in Section 11 of this SFEIR.

14.5.11 Noise Mitigation at Brookline Avenue Culvert

One of the more significant noise-generating activities is installation of piles for the culverts. Construction of the culvert under Brookline Avenue near the former Sears

parking lot will include a combination of day and nighttime work due the difficult traffic conditions at the Sears Rotary. As described in Section 5 of the DEIR, work on either end of the culvert can be constructed during the normal daytime construction period since there is sufficient room in adjacent park areas for mobilization and work areas. When constructing the across the Brookline Avenue, constructing new temporary lanes for traffic will result in significant traffic impacts unless done at night time.

In order to mitigate noise impacts on residences in the area the following noise mitigation measures will be undertaken:

- Regulation for the Control of Noise in the City of Boston will be followed for construction activities in Boston. The Brookline Noise Bylaw will also be followed for work in Brookline. A permit will be sought for any nighttime construction, as appropriate.
- Noise measurements, using appropriate field sound equipment will be carried out by the contractor on a weekly basis. The IEM will be provided these results and may request to witness the measurements. Should noise levels exceed the allowed limit measured at locations indicated in the regulations, the contractor will take steps as necessary to reduce noise to levels acceptable to the Resident Engineer and responsible municipal officials.
- All construction equipment will be fitted with suitable mufflers and similar noise abatement devices prior to receiving approval to commence work.

Installation of foundation piles will be required to use drilled piling techniques to reduce noise levels. Sheet piling will use vibrating driving equipment to reduce noise levels. Foundation piles and sheet piling work will not occur after to 11:00 PM, or will be limited to on weekends when traffic impacts are reduced and work can be accomplished during daytime hours.

14.6 Draft Section 61 Findings

As decreed by the Secretary, draft findings pursuant to M.G.L. Chapter 30, Section 61, are presented herein. This statute requires state agencies, which permit or fund projects for which an Environmental Impact Review is conducted under MEPA, to make certain "findings" with respect to how detrimental impacts of the project have been avoided, minimized and mitigated. The findings must reflect the information disclosed through MEPA documentation and must relate to the subject matter jurisdiction of the permitting agency. Thus, the state permits to be issued by DEP for dredging and for water quality certification require the DEP to issue Section 61 findings. EOEA must also issue findings pursuant to the MEPA process and MWRA, as an Authority of the Commonwealth, will also issue its findings in association with the 8(M) permit. The following contains proposed findings for consideration by the DEP, EOEA, and MWRA.

DRAFT

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
FINDINGS PURSUANT TO
M.G.L. CHAPTER 30, SECTION 61**

PROJECT NAME: The Phase I Muddy River Flood Control, Water Quality and Wildlife Enhancement and Historic Preservation Project

PROJECT LOCATION: Boston and Brookline, MA

PROJECT PROPONENT: Boston Parks and Recreation Department; Town of Brookline, MA

EOEA NUMBER: 11865

BACKGROUND

The primary impacts associated with the project are beneficial, including critically needed improvements in flood control infrastructure, rehabilitation of one of the world's great works of landscape architecture, along with improvements in water quality and wildlife habitat. However, proposed rehabilitation will result in the temporary disturbance of the Muddy River, public use of portions of the parklands, roadways, and pedestrian walkways.

PROJECT DESCRIPTION

Construction activities that are proposed within the project area include:

- The formation of staging areas for dredging equipment including belt filter presses and other appurtenances,
- The dredging and removal of accumulated sediment and debris,
- The restoration and re-vegetation of the staging area upon completion of the work,
- The planting of new vegetation,
- The repair or replacement of worn pathways, and
- Installation of new park benches.

The proposed construction and revegetation activities are shown in the Preliminary Design Report that is included in Appendix I of the DEIR.

PROJECT IMPACTS

A detailed analysis of project impacts was provided in Section 6 of the DEIR. Generally, the long-term impacts of the project will be beneficial, resulting in:

- Improved flood control
- Improved water quality
- Enhanced biological environment

Short-term impacts during the construction period will include the following:

- Temporary water quality impacts from the staging area, from dredge and debris removal locations, and from the return water.
- Temporary impact to vegetation at the staging area and adjacent to the river.
- Temporary impact to the limited aquatic and wildlife resources which exist.
- Temporary impact on recreational use and pedestrian access.

MITIGATION MEASURES

Performance standards to be met and other measures to mitigate construction-related impacts and to ensure continuation of post-construction benefits are listed in Table 14-1. The table also indicates in which reports or plans the specific measures will be addressed.

IMPLEMENTATION SCHEDULE

Construction phasing for planning purposes on the Phase I Project is currently assumed to be two construction contracts with bidding on the first contract in early 2006, construction start in 2006 (after receipt of all permits) and completion of the final construction contract in 2011. The two contracts are expected to be divided into; Contract 1 – Structural elements such as daylighting, new culverts and rehabilitation of bridge facade and Contract 2 – dredging elements, bank stabilization, landscaping and habitat restoration. This schedule is dependent on appropriation of federal, state, and municipal capital funds.

No construction will begin until all contractor plans have been submitted and approved.

Monitoring and reporting will be completed during construction, and beyond construction, as discussed further in this section and Section 6.

FINDINGS

For the reasons stated above, DEP hereby finds that, with implementation of the mitigation measures described above by the City of Boston, all practicable means and measures will be taken to avoid, minimize, and mitigate sewage related impacts to the environment resulting from the Proposed Phase I Muddy River Flood Control, Water Quality and Wildlife Enhancement and Historic Preservation Project. Appropriate conditions will be included in the Chapter 91 Permit, Water Quality Certification, and Special Waste Determination (as applicable) to be issued by DEP to describe more fully and ensure implementation of said measures.

Date

Appropriate Signature

DRAFT

**EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
FINDINGS PURSUANT TO
M.G.L. CHAPTER 30, SECTION 61**

PROJECT NAME: The Phase I Muddy River Flood Control, Water Quality and Wildlife Enhancement and Historic Preservation Project

PROJECT LOCATION: Boston and Brookline, MA

PROJECT PROPONENT: Boston Parks and Recreation Department; Town of Brookline, MA

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No construction will begin until all contractor plans have been submitted and approved.

Monitoring and reporting will be completed during construction, and beyond construction, as discussed further in this section and Section 6.

FINDINGS

For the reasons stated above, EOEa hereby finds that, with implementation of the mitigation measures described above by the City of Boston, all practicable means and measures will be taken to avoid, minimize, and mitigate sewage related impacts to the

environment resulting from the Proposed Phase I Muddy River Flood Control, Water Quality and Wildlife Enhancement and Historic Preservation Project. Appropriate conditions will be included in the Secretary's Certificate on the SFEIR to describe more fully and ensure implementation of said measures.

Date

Appropriate Signature

DRAFT

**MASSACHUSETTS WATER RESOURCES AUTHORITY
FINDINGS PURSUANT TO
M.G.L. CHAPTER 30, SECTION 61**

PROJECT NAME: The Phase I Muddy River Flood Control, Water Quality and Wildlife Enhancement and Historic Preservation Project

PROJECT LOCATION: Boston and Brookline, MA

PROJECT PROPONENT: Boston Parks and Recreation Department; Town of Brookline, MA

EOEA NUMBER: 11865

BACKGROUND

The primary impacts associated with the project are beneficial, including critically needed improvements in flood control infrastructure, rehabilitation of one of the world's great works of landscape architecture, along with improvements in water quality and wildlife habitat. However, proposed rehabilitation will result in the temporary disturbance of the Muddy River, public use of portions of the parklands, roadways, and pedestrian walkways.

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No construction will begin until all contractor plans have been submitted and approved.

Monitoring and reporting will be completed during construction, and beyond construction, as discussed further in this section and Section 6.

FINDINGS

For the reasons stated above, MWRA hereby finds that, with implementation of the mitigation measures described above by the City of Boston, all practicable means and measures will be taken to avoid, minimize, and mitigate sewage related impacts to the

environment resulting from the Proposed Phase I Muddy River Flood Control, Water Quality and Wildlife Enhancement and Historic Preservation Project. Appropriate conditions will be included in the 8(M) permit to describe more fully and ensure implementation of said measures.

Date

Appropriate Signature



Appendix A

APPENDIX A

MEPA CERTIFICATE AND COMMENT LETTERS ON FEIR



The Commonwealth of Massachusetts

Executive Office of Environmental Affairs

251 Causeway Street, Suite 900

Boston, MA 02114-2119

MITT ROMNEY
GOVERNOR

KERRY HEALEY
LIEUTENANT GOVERNOR

ELLEN ROY HERZFELDER
SECRETARY

May 1, 2003

Tel. (617) 626-1000
Fax (617) 626-1181
<http://www.mass.gov/envir>

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
ON THE
FINAL ENVIRONMENTAL IMPACT REPORT

PROJECT NAME : Emerald Necklace Environmental
Improvements Master Plan and Phase I
Muddy River Flood Control, Water
Quality, Habitat Enhancement, and
Historic Preservation Project

PROJECT MUNICIPALITY : Boston and Brookline

PROJECT WATERSHED : Charles River

EOEA NUMBER : 11865

PROJECT PROPONENT : Boston Parks and Recreation Department
and Town of Brookline

DATE NOTICED IN MONITOR : March 25, 2003

As the Secretary of Environmental Affairs, I hereby determine that the Final Environmental Impact Report (FEIR) submitted on this project **does not adequately and properly comply** with the Massachusetts Environmental Policy Act (M.G.L. c. 30, ss. 61-62H) and with its implementing regulations (301 CMR 11.00), and I hereby require the preparation of a Supplemental Final Environmental Impact Report (SFEIR).

Today's decision is directed at the deficiencies of the FEIR document, and in no way reflects on the goals of the project or its merits. I remain committed to the successful implementation of this important public project. The Executive Office of Environmental Affairs (EOEA), together with the project proponents and numerous dedicated people from agencies, advocacy groups, and the general public have invested considerable time and resources into the planning for the rehabilitation of the Muddy River and its environs, one of the nation's finest linear parks. Much work remains to be done before the project can pass muster with state permitting agencies, and before the Commonwealth can commit the next level of significant public

funding to the project¹. Nonetheless, I will continue to work with the proponents, the Citizens Advisory Committee, the Maintenance and Management Oversight Committee, and the many individuals who have committed their time and energy to ensure that this project moves forward. While this decision is a setback for the project schedule, it is also an opportunity to bring a wide range of interested parties together cooperatively, to rethink certain elements of the project, and to develop the institutional infrastructure that can make this project a national model for urban park rehabilitation and successful long-term management.

Standard of MEPA Review

As described in more detail below, the FEIR has not adequately addressed several issues critical to the project design. However worthy the project may be, the need to consider alternatives, document impacts, and demonstrate that the project design avoids, minimizes and mitigates Damage to the Environment is necessary as a matter of law, and is critical to protecting the Commonwealth's considerable financial investment in the project. For an FEIR to be deemed adequate, Section 11.08(8) of the MEPA Regulations requires me to find that "the aspects and issues have been clearly described and their nature and general elements analyzed in the EIR or during MEPA review, that the aspects and issues can be fully analyzed prior to any Agency issuing its Section 61 Findings..."

As described in more detail in this Certificate, after examining the record before me, including but not limited to the Draft and Final EIRs, written comments received, correspondence related to the Charlesgate waiver decision, and the Emerald Necklace Master Plan, I find that there is not enough information on alternatives, impacts, and mitigation to meet that regulatory standard. The FEIR has not clearly described and analyzed the general elements of several critical aspects of the project. In addition, the state permitting agencies have commented that the

¹ The Commonwealth is authorized to transfer \$24,000,000 to help fund the project upon successful completion of the EIR process. Since 1984, the Commonwealth has provided approximately \$16,000,000 to the proponents for improvements to the Emerald Necklace, most of which has required no cash match. The Commonwealth has also provided the proponents with other forms of direct financial and in-kind assistance with the Emerald Necklace over this period. The total public investment in the project currently under MEPA review (including federal, state, and local contributions) totals more than \$92,000,000..

FEIR provides insufficient information upon which to base their required Section 61 Findings. The two state agencies with the most direct involvement in the project (the Department of Environmental Protection and Department of Environmental Management) have both recommended additional MEPA review of the project to address key issues. Additional information and enforceable commitments are also necessary prior to EOEA's own Section 61 Finding allowing the additional disbursement of state funds to the proponents.

Several aspects of the proponents' preferred alternative are not permissible under the state's wetland protection regulations, and the FEIR does not contain the information necessary to determine whether a variance to those regulations is appropriate. The FEIR has also failed to provide adequate discussion of the maintenance and management aspects of the project, and has failed to address several issues specifically highlighted in the Certificate on the Draft EIR and in the Chalesgate Phase I Final Record of Decision. The resolution of these issues is central to the project meeting its potential, and to ensuring that the Commonwealth's financial support remains tenable in the current severely constrained fiscal climate. The remainder of this Certificate focuses on the additional information needed to allow the project to move forward in a manner that is consistent with the requirements of state environmental law, consistent with sound fiscal management policies, and worthy of the resource the project is designed to restore and protect.

Project Description

As described in the Environmental Impact Report, the proposed project involves a range of physical improvements and management practices that will produce flood control, water quality improvements, habitat enhancement, landscape restoration, pedestrian and automobile circulation improvements, and building and bridge restoration along the Muddy River. The project constitutes the first phase in the long-term restoration of the entire system of Emerald Necklace parks in Boston and Brookline. This MEPA review is proceeding under a Special Review Procedure (SRP), established in a certificate dated April 29, 1999. Pursuant to the SRP Certificate, a Citizens Advisory Committee (CAC) representing a full range of interested parties has met regularly over the past four years, and it has reviewed in detail drafts of the FEIR document and submitted comments on the FEIR. The project is also subject to a Memorandum of Understanding (MOU) executed in November 1999, by and among the Executive Office of Environmental Affairs, the Department of Environmental

Management, the Massachusetts Emergency Management Agency, the Boston Water and Sewer Commission, the Town of Brookline and the City of Boston.

As described in the FEIR, the project is comprised of six geographic elements: Charlesgate, the Back Bay Fens, the Riverway, and the three ponds within Olmsted Park (Leverett, Willow, and Wards Ponds). The FEIR describes each element as follows:

- Charlesgate: removal of waterway obstructions under Ipswich Street; dredging 3,300 cubic yards (c.y.) of sediment and debris; and landscape rehabilitation. (In July 2002, a Phase I Final Record of Decision granted a waiver allowing much of this work to proceed pending completion of the FEIR).
- Back Bay Fens: daylighting culverts at the Fens Bridge and former Sears parking lot to restore the Olmsted-designed shoreline; bank-to-bank dredging to remove 95,500 c.y. of sediment and debris, and 23,500 c.y. of Phragmites; installing new arch culverts under the Riverway and Brookline Avenue; reconstructing roadway storm drain systems; and bank and landscape rehabilitation.
- Riverway: bank-to-bank dredging to remove 21,200 c.y. of sediment and debris, and 10,000 c.y. of Phragmites; reconstructing roadway storm drain systems; and bank and landscape rehabilitation.
- Leverett Pond: dredging to remove 23,900 c.y. of sediment and debris; and bank, island, and landscape rehabilitation.
- Willow Pond: dredging to remove 5,900 c.y. of sediment and debris; and bank, path, and landscape rehabilitation.
- Wards Pond: dredging to remove 15,600 c.y. of sediment and debris; and bank and landscape rehabilitation.

The project also includes project-wide Best Management Practices (BMPs) for stormwater management and a maintenance and management plan. The proposed BMPs include both structural and source control BMPs, including street sweeping, catch basin cleaning, and particle separators. The FEIR also identifies the proponent's preferred management structure for the project.

Required Permits and MEPA Jurisdiction

- The project will require several variances under the Wetlands Protection Act, a 401 Water Quality Certificate, a Chapter 91 License, and a Special Waste Determination, all from the Department of Environmental Protection (DEP). The project

will require a Section 404 permit under the Federal Clean Water Act from the U.S. Army Corps of Engineers. The project will also require a Sewer Use Discharge Permit and Section 8(M) permit from the Massachusetts Water Resources Authority (MWRA). Because the Emerald Necklace parks are listed on the National and State Registers of Historic Places, the project is subject to review by the Massachusetts Historical Commission, the Boston Landmarks Commission, and the Brookline Preservation Commission. The project is receiving financial assistance from the Commonwealth; therefore, MEPA jurisdiction is broad in scope, extending to all aspects of the project with potential impacts on the environment.

SCOPE OF THE SFEIR

General

As modified by this Certificate, the SFEIR should be a stand-alone document prepared in accordance with the general requirements for outline and content found in Section 11.07 of the MEPA regulations. The SFEIR should include a copy of this Certificate and a copy of each comment letter received. The proponents should circulate the SFEIR at a minimum to those parties who submitted written comments on the FEIR and to any agencies from which the proponents will seek Agency Actions. In addition, the proponents should provide a reasonable number of copies free of charge on a first come, first served basis.

Alternatives

Two aspects of the project will require additional detailed alternatives analyses: wetlands/water quality and project management structures. The SFEIR should include the alternatives analyses necessary for DEP to evaluate any requests for variances from the Wetland Protection Act regulations. The SFEIR should also include additional information on alternative management structures. I explain both requirements in more detail below. I will allow the proponents to incorporate the additional alternatives analyses into the specific chapters in which they are relevant. The SFEIR need not include a separate, stand-alone alternatives analysis.] 1
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Project Permitting

- The permitting for the project (particularly for wetlands) is complex. The SFEIR should include a summary of all permits needed for each subarea of the project, and demonstrate either how the project design meets applicable performance standards, or] 3

how the project meets criteria for a variance from applicable performance standards. The SFEIR should also document any efforts the proponent has made to consult and/or coordinate with the permitting agencies.

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Wetlands

Portions of the project will qualify for limited project status under the Wetland Protection Act regulations (see 310 CMR 10.53(4)). However, significant portions of the dredging work do not meet the performance standards contained in 310 CMR 10.00 and will therefore require a wetlands variance. DEP may allow a variance upon a finding that: 1) the project serves an overriding public purpose, 2) there are no feasible alternatives to the project that would meet the regulatory standards, and 3) that the project design incorporates maximum feasible mitigation for any impacts found unavoidable. The FEIR has argued that much of the project will qualify as a limited project, missing the opportunity to present analysis that may justify a wetlands variance for some or all portions of the project. The SFEIR needs to include much more information on those aspects of the project, outlined below and discussed in detail in the comments from DEP, which do not appear to meet limited project status, and to discuss how those aspects of the project might qualify for variances from the Wetland Protection Act regulations.

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The proposed bank-to-bank dredging of the Back Bay Fens appears to meet the limited project provisions of the Wetlands Protection Act regulations. However, since dredging at Charlesgate was more extensive than originally anticipated, the proponents should verify that the proposed level of dredging in the Back Bay Fens is still necessary to achieve flood control goals.

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The bank-to-bank dredging of the Riverway, on the other hand, does not appear to meet the limited project provisions, and the FEIR does not include sufficient information to evaluate the variance request. The SFEIR should reevaluate the need for bank-to-bank dredging in this project subarea, and include any additional information necessary to evaluate a variance request, if a variance still proves necessary.

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The dredging of the three ponds can meet limited project provisions, but wetland replication must take place in the affected ponds, not in the Fens as proposed. In addition, the proposal for in-pond sedimentation basins would require a variance. The SFEIR should provide additional information to

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demonstrate that the dredging operation (including replication) will be conducted in a manner that meets limited project provisions. The SFEIR should reevaluate the need for in-pond sedimentation basins, and evaluate this aspect of the project in light of the variance criteria.

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cont'd
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The FEIR proposes the use of in-stream sedimentation basins to compensate for the sediment removal function currently provided by the *Phragmites* stands along the Muddy River. DEP has determined that the in-stream sedimentation basins do not meet limited project provisions and cannot meet the variance tests. The SFEIR must therefore evaluate alternative sediment removal methods (including the expanded use of BMPs as discussed below).

10

The extent of alteration to Bordering Vegetated Wetlands (BVW) and replication is unclear from the FEIR. The SFEIR should quantify BVW impacts and ensure that replication meets applicable performance standards. The SFEIR should examine whether the daylighting of the river proposed for the Fens Bridge and former Sears parking lot could provide an opportunity for BVW creation.

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Water Quality

The FEIR argues that the in-stream sedimentation basins are not required for flood control, but rather to impound sediment associated with stormwater. The in-stream sedimentation basins therefore do not meet the requirements of the Commonwealth's water quality regulations (314 CMR 9.00). The SFEIR must examine alternative methods of sediment impoundment that are consistent with the water quality regulations. In addition, the SFEIR should examine the feasibility of alternatives to bank-to-bank dredging in the three ponds that would preserve existing BVW (exclusive of *Phragmites* and other invasive species) and bank intact.

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The SFEIR should include a water quality monitoring program tailored to each specific subarea of the project. The program proposed in the FEIR relies on a generic approach that appears based on the Charlesgate subarea, which contains some of the cleanest sediments in the corridor and may therefore not represent an appropriate model for other subareas. The SFEIR should also respond to the concerns of DEP and others related to the proposed sediment management plan.

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The FEIR proposes dredging of the entire corridor followed by stabilization/restoration work. This construction sequence is likely to cause significant environmental impacts over several

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years, particularly if mechanical dredging techniques are widely needed. The SFEIR should investigate alternative construction phasing, with dredging and reconstruction activities completed in geographic subareas prior to work beginning in another subarea.

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Cont'd

Stormwater Management/Pollution Control

Based on DEP review, the analysis in the FEIR has not justified the reductions in sedimentation rates and claimed improvements in water quality from the proposed stormwater and pollution control Best management Practices (BMPs). The SFEIR should present more information to justify the conclusions reached, or include appropriate revisions. The SFEIR should also evaluate the potential for increased compliance with the standards for total suspended solid (TSS) removal contained in the DEP Stormwater Management Guidelines. (I recognize that retrofitting the highly urban environment of the project area to achieve full compliance with the 80% TSS removal standard is infeasible, but I believe the target removal rate in the FEIR may be too low.) The SFEIR should evaluate the ability of the proponents to target the largest nonpoint sediment sources from the largest drainage catchments areas for TSS removal and other treatment as appropriate.

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With the feasibility of in-stream sedimentation basins in doubt, it is critical that the proposed BMP program remove as much sediment as possible, in order to extend the life of the project as long as possible. The proponents are currently conducting a BMP pilot program to evaluate the effectiveness of various BMPs, although the results of the pilot program were not available for inclusion in the FEIR. The SFEIR should include any results that are available. I note that the final decision to employ specific BMPs is likely to occur after review of the SFEIR. The selection of BMPs is therefore likely to be one of many important questions for the project management to resolve after completion of the MEPA process.

20

Maintenance and Management Structure

My two immediate predecessors as Secretary have both stressed the need for proper maintenance and management of the Muddy River park system. The 1999 MOU, the 1999 Certificate on the Environmental Notification Form, the 2002 Certificate on the Draft EIR, and the 2002 Charlesgate Phase I waiver decisions dwelled at length upon this issue, and the issue has been of central importance to the project since its inception (Olmsted himself wrote on the importance of the issue). I will not

belabor its importance here, except to reaffirm that I consider maintenance and management as the key to ensuring that the project meets its long-term goals and that the significant public investment in the project is adequately protected. In fact, I view the project itself, with all of its worthy goals, as in effect a deferred maintenance project. As stewards of this park system, we owe it to our constituents and to future generations to ensure that the hard lessons learned on the effects of decades of neglect and improper maintenance are not repeated again.

Given the centrality of this issue to the long-term success of the project, I am disappointed in the discussion of maintenance and management presented in the FEIR. It lacks detail, and is unresponsive to both the requirements of the Draft EIR Certificate and to the requirements of the Charlesgate Phase I waiver decisions. The discussion is also unresponsive to the many specific comments received on the Draft EIR, and to the efforts of the CAC since the publication of the Draft EIR. The management structure trivializes the role of the Maintenance and Management Oversight Committee (MMOC), which I consider an essential part of any successful project management effort. The issue of project maintenance and management requires much work before I can have the confidence that the Commonwealth's investment is protected, and before I am able to make the EOE Section 61 Findings allowing the transfer of additional state funds.

The SFEIR must present a much fuller discussion of the project management structure, including potential alternative management structures. The FEIR presents little detail on alternative structures and little justification as to why the proponents selected a public-private partnership with the Emerald Necklace Conservancy as the preferred management structure. The SFEIR must present a full discussion of alternative management structures, including the proponent's preferred management structure, the "Rowe cabinet structure," and the structure proposed by the Emerald Necklace CAC and outlined in a memo from the CAC to the proponents dated December 23, 2002. For each alternative, the SFEIR should evaluate how the management structure would work, what the responsibilities of each participant would be, how the structure can advance the project goals, and how the structure can meet the requirements of the MOU and the various Certificates. The discussion should also demonstrate how the proposed management structure would protect the Commonwealth's investment and how the structure would be consistent with EOE's Section 61 obligations.

21

The Maintenance and Management Oversight Committee (MMOC) is a necessary component of the project management structure, as mandated in the Charlesgate Final Record of Decision. As stated by my predecessor, the proponents will of course continue to manage the resources under their control, with the flexibility they need to make day-to-day decisions and implement long-term management and operational policies. However, the MMOC provides an important channel for public access to the stewardship decisions being taken in the public's name. Strong public participation through the MMOC will help build and strengthen public support for the project, and ultimately provide for improved stewardship of the resource. The MMOC provides a key assurance of transparency in the maintenance and management decisions affecting the project. The FEIR has all but ignored the important (and legally mandated) role of the MMOC in the project maintenance and management structure (the FEIR does not even name the committee correctly). The SFEIR must specify how each management structure would incorporate the MMOC, and should demonstrate that the structure provides a role to the MMOC commensurate with the level of responsibility and involvement for the committee required by the Charlesgate Phase I decisions. Absent a clear demonstration that the project management structure includes a prominent and appropriate role for the MMOC (and that the proponents are meeting all existing obligations to provide supporting staff to the MMOC), I will not make a Section 61 Finding for the transfer of additional state funds to the proponents.

22

The maintenance and management structure that emerges from the EIR process will be formalized through a Memorandum of Agreement (MOA) among the proponents, the Metropolitan District Commission (or its successor organization), the Emerald Necklace Conservancy, and other appropriate parties with a formal role in maintenance and management. Whatever the structure selected, the MMOC should also be a signatory to the MOA. The SFEIR should include a Draft MOA that specifies the maintenance and management structure and the roles and responsibilities of the various signatories. The MOA should also broadly outline enforceable performance standards, including commitments to improved stewardship, historic preservation and maintenance of parklands, implementation and maintenance of BMPs, coordination of maintenance activities across jurisdictional boundaries, appropriate staffing commitments, commitments to provide information among all signatories and to the public and EOEAs, dispute resolution procedures, and minimum requirements for frequency of top level management meetings.

23

Maintenance and Management Plan

The Certificate on the Draft EIR required the proponents to develop enforceable maintenance and management commitments. The FEIR contains only a vague discussion of maintenance that falls far short of the requirements in the Certificate on the Draft EIR. The FEIR has also not responded to the specific suggestions made in the DEM comment letter on the Draft EIR (dated April 8, 2002). The SFEIR should include a maintenance and management plan (based on the outline contained in DEM's comment letter) for the park system that includes the following information:

- 1) overall management philosophy and vision
- 2) management, staffing, equipment, tasks, and schedules, with associated costs
- 3) monitoring procedures to assess the continued health and integrity of the project
- 4) measurable performance standards for appropriate resources
- 5) guidelines for preservation maintenance and monitoring
- 6) management structure and coordination
- 7) management policies related to protection and sustainable use of the parks (e.g., vehicular and pet control)
- 8) reporting procedures and enforcement
- 9) training requirements

I recommend that the proponents avail themselves of DEM's expertise in developing maintenance plans appropriate for inclusion in MEPA reviews. DEM has offered assistance in development of the maintenance and management plan. The plan will provide the starting point for subsequent decisions that emerge from the project management structure specified in the SFEIR.

I recognize the fiscal challenges imposed on the proponents by a proper maintenance and management plan. A degree of flexibility may be needed to ensure that long-term maintenance and management of the project receives proper funding through the vagaries of the business cycle, and through the contingent nature of yearly municipal appropriations. To address these concerns, the SFEIR should quantify the amount of resources (human, financial, and other) currently expended on maintenance and management, and how future obligations would increase in response to the requirements of this Certificate and the maintenance and management plan that finally emerges from the continuing review process. The SFEIR should identify any potential deficits

between future maintenance and management needs and anticipated budgets. If shortfalls exist, the SFEIR should consider a plan to fully engage the Emerald Necklace Conservancy (ENC) in a public-private partnership, with ENC using its expertise to raise private funds to offset any deficits.

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Cont

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Historic Resources

Preservation and restoration of the historic resources in the project area are integral parts of the project. The park system is listed on the State and National Registers of Historic Places, and represents an historic legacy worthy of the time and resources spent during the MEPA review to ensure sensitive restoration and appropriate future stewardship. Preservation of the historic resources is also a major goal of the Emerald Necklace Master Plan, which provides the overall context in which the current project is undergoing review.

The fate of the Carlton Street Footbridge (CSF) has been a continuing source of controversy. The Master Plan envisions restoration of this important historic link between the Riverway and the adjacent residential neighborhoods of Brookline. The disposition of the CSF was not originally part of the project currently under MEPA review, but given its documented importance, the Draft EIR Certificate assumed that the Town of Brookline would "...act in good faith to expeditiously implement the elements of the Master Plan within its control, including the rehabilitation and reopening of the Carlton Street Footbridge."

The analysis conducted in the development of the Master Plan and review of the Draft EIR served amply to establish the importance of the restoration of the CSF to the overall project goals, and I hereby reaffirm EOE's position on the CSF as expressed in earlier decisions. (I note that subsequent to the Draft EIR Certificate, Preservation Massachusetts listed the CSF as one of the ten currently most endangered historic resources in the Commonwealth.) The FEIR presents an uncertain picture of the future of the CSF, which does not give confidence that the Town of Brookline is expeditiously implementing the rehabilitation and reopening of the CSF.

For the reasons outlined above, as part of my decision with respect to project funding, I am requiring that the SFEIR contain enforceable commitments and a timetable for restoration and reopening of the CSF in its current location. I will include such requirements in any Section 61 Finding authorizing transfer of additional EOE's funds for the project. I will work with the

] 29

Town of Brookline and the Massachusetts Historical Commission to identify possible sources of additional funding for the restoration work.

Dirt bike enthusiasts continue to develop, maintain, and operate an unauthorized "dirt bike park" adjacent to the Back Bay Yard and the transit right-of-way. The Certificate on the Draft EIR included a requirement that the proponent determine ownership of the area in question and include plans for restoration of the area if the City of Boston were found to own the parcel. The FEIR reports that the parcel currently used by dirt bikers is partially owned by the City of Boston and partially owned by the Massachusetts Bay Transportation Authority (MBTA). Despite the partial ownership by Boston, the FEIR proposes the continued use of the area (which is partially within the Olmsted system) for the unauthorized dirt bike activities. The discussion in the FEIR runs directly counter to the requirements of the Certificate on the Draft EIR, and in effect sanctions the expropriation of an Olmsted park for use by dirt bikes. I reiterate the requirements of the Draft EIR Certificate relative to this issue, and expect a satisfactory response in the SFEIR.

30

Rare Species

The Natural Heritage program has indicated its satisfaction with the rare species mitigation presented in the FEIR. The SFEIR need not include additional analysis of this issue, except to the extent that plans for work in areas that provide habitat for rare species change as a result of the additional analysis required elsewhere in this Certificate.

31

Recreation Impacts

I have received comments from local youth sporting leagues raising concerns with the possible loss of access to Daisy Field while the area is used for construction staging purposes. The SFEIR should investigate whether other sites are available in the area for construction staging, and/or present plans to avoid or minimize disruptions to Daisy Field during the construction process.

32

Comments

- The FEIR has not responded fully and adequately to many of the comments received on the Draft EIR. The FEIR has generated a substantial number of detailed and specific comments from a wide variety of agencies, advocates, and individuals. The SFEIR

33

should include responses to the comments received, with a level of detail and analysis appropriate to the comment made. The SFEIR should present additional data or narrative as appropriate to respond to the comments received. The SFEIR should contain an indexed response to comments section that enumerates individual points within comment letters and directs reviewers to the appropriate section of the document where the response is located.

33

Section 61 Findings/Mitigation

The SFEIR should contain proposed Section 61 Findings for each state agency that must take an Agency Action associated with the project (including EOEA and MWRA, proposed findings for which were not included in the FEIR). The SFEIR should include a summary of all mitigation measures to which the proponent has committed, and include details on funding responsibilities and timetables for implementation.

34

May 1, 2003

Date


Ellen Roy Herzfelder

Comments received (continues on next page):

02/24/03 John Schemmer
03/28/03 Massachusetts Water Resources Authority
04/01/03 Division of Fisheries and Wildlife
04/03/03 Adaptive Environments
04/23/03 Town of Brookline Conservation Commission
04/23/03 Cathleen Cavell
04/23/03 Brookline Greenspace Alliance
04/24/03 Town of Brookline Park and Recreation Commission
04/24/03 Charles River Watershed Association
04/24/03 Department of Environmental Protection NERO
04/24/03 Sarah Freeman and Sam Sherwood
04/24/03 Friends of the Carlton Street Footbridge
04/24/03 Town of Brookline DPW and City of Boston PRD
04/24/03 Boston Greenspace Alliance
04/24/03 Emerald Necklace Citizens Advisory Committee
04/24/03 Friends of the Muddy River
04/24/03 Department of Environmental Management
04/24/03 Precinct One Town Meeting Members
04/24/03 Medical Academic and Scientific Community Organization
04/24/03 Jamaica Plain Regan Youth league

EOEA #11865

Final EIR Certificate

05/01/03

04/24/03 Friends of Leverett Pond
04/24/03 Hugh Mattison
04/24/03 Muddy River Restoration Project Maintenance and
Management Oversight Committee
04/25/03 Emerald Necklace Conservancy
04/25/03 JP Youth Soccer
04/25/03 Massachusetts Historical Commission
04/25/03 Massachusetts Bay Transportation Authority
04/25/03 City of Boston Redevelopment Authority
04/25/03 City of Boston Environment Department

ERH/ASP/asp

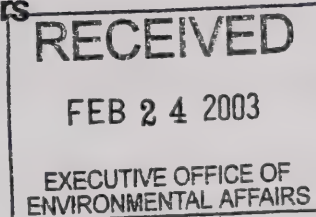
cc: Colonel Thomas Koning, U.S. Army Corps of Engineers

33 Euston Street
Brookline MA 02446
617 277 0595 schemmerja@aol.com

Letter 1

February 20, 2003

Ellen Roy Herzfelder, Secretary
Executive Office of Environmental Affairs
251 Causeway Street, 9th Floor
Boston MA 02114



Attention: Teresa Sousa

Dear Secretary Herzfelder:

I spoke last week with your assistant, Ms. Sousa, about arranging a meeting between you and a small group from Brookline regarding the EOE's involvement with the Carlton Street footbridge. At that time, I mentioned that Beth Myers had originally offered to help arrange such a meeting, but then, more recently, Ms. Myers told me that she had forwarded my letter on to you.

I enclose a brief summary of the concerns the group would like to discuss.

I will be happy to act as an intermediary in facilitating such a meeting and can be reached most conveniently at the email address above.

Thank you for your consideration,

Very truly yours,

A handwritten signature in dark ink, appearing to read "John A. Schemmer".

John A. Schemmer

encl.

The Carlton Street Footbridge Controversy

Executive Summary

The Romney administration is committed to "cleaning up the mess" in government. Under current circumstances and until the legislative situation is more supportive, the Governor will be largely limited to exercising executive prerogatives. The Carlton Street footbridge illustrates one component of "out of control" government that the Governor can affect immediately.

The disposition of the Carlton Street footbridge should be subject to common sense and discretion. The local community in Brookline is strongly opposed to reopening this long disused and decayed structure. Nevertheless, a small number of activists have almost certainly shaped the EOE's policy into one of intransigence. This seeming conflict goes even beyond the anomaly of an environmental agency extending its jurisdiction into the evaluation of an architectural "element."

As an isolated case, the footbridge represents relatively a small expenditure of \$1 to \$2 million. In the aggregate, activist-driven expenditures account for many tens of millions of dollars of unwanted government projects. At a minimum, the new administration could insure that executive and policy management positions do not simultaneously serve private advocacy organizations.

1. The Carlton Street Footbridge, Brookline MA

The Carlton Street footbridge is a steel truss structure dating from the 1890's. It was a pedestrian bridge spanning the Boston & Albany Highland Branch railroad tracks from the sidewalk on Carlton Street, Brookline, to the Muddy River section of the Emerald Necklace Park. In 1959 the Highland Branch was converted into the MBTA's Riverside trolley line.

The bridge was closed 25 years ago because of neglected maintenance, structural deterioration and because closure was deemed necessary for public safety. At this point the deteriorated, totally rusted out structure must be either removed or extensively rebuilt. Temporary stabilization has been required to prevent complete collapse.

2. Relationship of the Footbridge to the Emerald Necklace Master Plan.

The Emerald Necklace Master Plan is the blueprint adopted by the Commonwealth of Massachusetts, the City of Boston, and the Town of Brookline in 1984 to restore the Emerald Necklace park. This Plan has required and will require extensive funding from Massachusetts, Boston, and Brookline, as well as significant Federal funding.

The footbridge is not included in the extensive, and much needed, Phase I of the Emerald Necklace Plan, which deals principally with flood control and dredging. In fact, language concerning the footbridge in the Master Plan refers only to Brookline studying the feasibility of restoring the footbridge.

A small but vocal group of special interest activists are attempting to use the Emerald Necklace Master Plan as a vehicle to force the town to rebuild and reopen the bridge at the public's expense.

3. Origin and Historical Significance

The bridge was built in the 1890's at the request of the Town of Brookline over a railroad line, now the MBTA tracks. At that time, the bridge was located at the site of a railroad station that no longer exists.

The historical argument for restoration rests on the assertion that the footbridge is an integral part of Olmstead's vision of the Park. There is, however, no historical documentation establishing this bridge as an "integral element" in Olmsted's Emerald Necklace park design.

The Carlton Street Footbridge was not designed by the architectural firm that designed all of Olmsted's Emerald Necklace bridges.

Although all of the Olmsted bridges in the Emerald Necklace are of a uniform style and constructed of stone, the Carlton Street Footbridge is a steel truss structure, the cheapest construction available at that time.

The final Olmsted plan of the Emerald Necklace shows no bridge at Carlton Street. Nor is there any documentation that this bridge was sited to provide a "panoramic entrance" as some activists have asserted.

4. Park Access

Park access from the adjacent Brookline community has never been at issue for the entire time the bridge has been closed. An entrance to the park at the MBTA Longwood T-stop, 500 feet away, has superseded the original access afforded by the bridge. In addition, recent studies estimate only 20 pedestrians might use a restored footbridge at peak times.

5. Public Safety

The Carlton Street Footbridge is located at a heavily traveled, congested hairpin turn in Carlton Street. Reopening the footbridge to pedestrians (and associated use by cyclists, skateboarders, etc.) would compound traffic risk. |.

Both Brookline police officers and residents believe that reopening the bridge would make the adjacent community less safe. The park has a higher crime rate than the bordering Brookline neighborhood. Muggings and robberies are not infrequent.

Moreover, a bridge at that location leading to a park area away from public view and lightly patrolled, could well serve as a convenient escape route for individuals committing crimes in Brookline.

6. Expense

The removal of the bridge would cost about \$60,000. Restoration would cost about \$1 million and rebuilding to include proper handicapped access ramping would increase the cost by a factor of 2-3. The cost of rebuilding and restoration would be born by the Town, and possibly by State and Federal agencies through grant awards.

Even after restoration and massive expenditure, this bridge cannot retain its historical integrity because of current MBTA code requirements (caging, power cables, etc.).

7. Local Opposition to Bridge Restoration

The reopening of the bridge is opposed by a substantial majority of local residents in the Brookline neighborhood near the bridge. There are over 200 signatories to a petition requesting that the bridge remain closed.

Of the fifteen local Town Meeting members elected to represent the neighborhood, only two support reopening the bridge. The public has repeatedly spoken by defeating advocates of bridge restoration in yearly Town elections.

8. Governmental Process

The bridge issue is illustrative of how Massachusetts State government operates. It provides a case study of how non-governmental activist groups can co-opt and drive spending priorities. Cumulatively, this dynamic is a major contributor to "out of control" government.

The proponents of bridge restoration are activists and board members of private preservation and "green space" advocacy groups. A small number of these individuals serve on many or all of the involved entities, functioning as interlocking, coordinated directorates. In this way, a few committed individuals have been able to "amplify" their influence into apparent "popular will" concerning the Carlton Street footbridge. 1.1

The Master Plan sets forth certain standards concerning cost, historicity, handicapped accessibility and safety-which are not met by a restored footbridge. Notwithstanding, in April 2002, Robert Durand, Secretary of Environmental Affairs, issued a Certificate (April 16, 2002, EOE #11865) pursuant to the Draft Environmental Impact Report, stating that it is assumed that Brookline will expeditiously restore and reopen the footbridge.

The Certificate goes on to state that future State funding may be at risk for Master Plan elements if Brookline were to make a decision to remove the footbridge. It is hard to understand why this insignificant, rusted out structure -- which will require over \$1 million to restore and which presents serious safety issues to the community -- should receive such prominence.



MASSACHUSETTS WATER RESOURCES AUTHORITY

Charlestown Navy Yard
100 First Avenue
Boston, Massachusetts 02129

Telephone: (617) 242-6000
Facsimile: (617) 788-4899

Frederick A. Laskey
Executive Director

March 28, 2003

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MAR 28 2003

MEPA

Ellen Roy Herzfelder, Secretary
Executive Office of Environmental Affairs
Attn: MEPA Office - EOEA #11865
251 Causeway Street, Suite 900
Boston, MA 02114

Subject: Final Environmental Impact Report
Phase 1 Muddy River Flood Control, Water Quality Habitat Enhancement, and
Historic Preservation Project - EOEA #11865

Dear Secretary Herzfelder:

Staff at the Massachusetts Water Resources Authority (MWRA) has had the opportunity to review the Final Environment Impact Report (FEIR) for Phase 1 Muddy River Flood Control project and offers the following comments.

As described in the FEIR, the City of Boston and the Town of Brookline propose to rehabilitate six miles of the Muddy River from Dorchester to the Back Bay. Phase I includes the following: dredging, flood control, water quality improvements, aquatic/riparian habitat enhancement, historic rehabilitation, and best management practices within the Muddy River area (including the Back Bay Fens, the Riverway, Olmsted Park and its waterways). The project will also address flooding in the area, including increasing the capacity of culverts under the former Sears parking lot and at the Fens Bridge. Our comments below are based on a review of the FEIR and a preliminary review of our records of utility conditions in the project area.

Based on the description of work included in the FEIR, it appears that there may be a need to discharge groundwater into the combined sewer (a sewer receiving intercepted surface runoff, municipal sewage, and subsurface waters from infiltration). Since the Muddy River Project is located in a combined sewer area, should the need to discharge groundwater occur during project construction a representative must contact Walter Schultz, MWRA, Industrial Coordinator (617) 305-5665, TRAC Department to obtain a MWRA Sewer Use Discharge Permit Application¹.

2.1

¹ The MWRA prohibits the discharge of groundwater to the sanitary sewer system, pursuant to 360 C.M.R. 10.023(1) except in a combined sewer area when permitted by the Authority and the municipality.



Due to the presence of MWRA sewers located within the proposed Phase 1 Muddy River project area, MWRA is concerned that they be protected from the use of heavy equipment and materials used during the implementation of the project. Therefore, an 8M Permit will be required from the MWRA to minimize the risk of damage while the proposed work is performed over or near MWRA utilities. To obtain such a permit, a representative must contact Kevin McKenna, at (617) 689-8179, Project Manager, Operations Support at MWRA.

Lastly, in an effort to assist in inter-agency coordination, staff from MWRA's CSO Group will be available to work with appropriate governmental agencies as the project gets underway particularly with the operators of the Boston Water and Sewer Commission's gatehouses. The operation of the gatehouses is critical to the river's water elevation and the control of the water elevation during the dredging should be monitored closely (both up stream and down stream of the dredging activities) during wet and dry weather.

Should you have any questions or desire further information on these comments, please contact David Kubiak within MWRA's CSO Group at (617) 788-4394. Thank you for the opportunity to comment.

Very truly yours,



Marianne Connolly
Program Manager, Regulatory Compliance

cc: David Kubiak, CSO Program, MWRA
Jeremy Hall, CSO Program, MWRA
Kevin McKenna, Operations Support, MWRA
Walter Schultz, Industrial Coordinator, MWRA
Paul Keohan, BWSC

Letter 3
AD



Commonwealth of Massachusetts

Division of Fisheries & Wildlife

MassWildlife

Wayne F. MacCallum, *Director*

31 March 2003

Ellen Roy Herzfelder, Secretary
Executive Office of Environmental Affairs
Attention: MEPA Office
Arthur Pugsley, EOE No. 11865
251 Causeway St., Suite 900
Boston, Massachusetts 02114

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APR 2 2003

MEPA

Project Name: Phase I Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project (Muddy River project)
Proponent: Boston Parks and Recreation Department and Brookline Department of Public Works
Location: Muddy River, Boston, Brookline
Document Reviewed: Final Environmental Impact Report
NHESP File Number: 99-4172

Dear Secretary Roy Herzfelder,

The Natural Heritage & Endangered Species Program (NHESP) of the MA Division of Fisheries & Wildlife has reviewed the Final Environmental Impact Report for the Muddy River project and would like to offer the following comments regarding impacts to state-protected rare species. The FEIR clearly describes the steps involved in protection of the endangered Three-spine Stickleback (*Gasterosteus aculeatus*). We support the proposed changes to protect the two separate populations of this species. It is our opinion that the project will not adversely affect habitat for the Three-spine Stickleback.

We recommend one change to the "Survey and Capture Protocols." To avoid killing sticklebacks, the water temperature in the transfer buckets must be equalized with water in the temporary holding pond prior to releasing the captured fish.

3.1

We appreciate the opportunity to comment on this project.

Sincerely,

Patricia Huckery
NHESP Endangered Species Project Analyst

www.masswildlife.org

Copies to:

Boston Parks and Recreation Department
1010 Massachusetts Avenue
Boston, MA 02118

Brookline Department of Public Works
333 Washington Street
Brookline, MA 02445

Boston Conservation Commission
One City Hall Plaza, Room 805
Boston, MA 02201

Brookline Conservation Commission
333 Washington Street
Brookline, MA 02445

Rachel Freed
Department of Environmental Protection
205A Lowell Street
Wilmington, MA 01887

Bruce R. Conklin
CDM
One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139

Jason M. Cortell and Associates, Inc.
244 Second Avenue
Waltham, MA 02451

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APR 3 2003

MEPA

April 2, 2003

Secretary Ellen Roy Herzfelder
Executive Office of Environmental Affairs
MEPA Office
251 Causeway Street, Suite 900
Boston MA 02114

RE: Comments on Muddy River Final Environmental Impact Report



Dear Secretary Herzfelder,

Thank you for the opportunity to comment on the Muddy River FEIR. Adaptive Environments is keenly interested in planning, zoning and parcel development in the context of our initiative called *Neighborhoods Fit for People, Universal Design at the Urban Scale in Boston*. Our goal is to be a resource for review of plans for compliance with state and federal laws governing accessibility as well as information on best practices for design that integrates the most effective solutions for all users. We use the term 'universal design' to describe the framework for solving problems with the widest possible spectrum of users in mind and without special features or the need for adaptation.

Adaptive Environments is a 25 year old Boston-based educational non-profit dedicated to promoting universal design. Universal Design is a worldwide movement that emphasizes human-centered design, creative solutions that work for the widest possible spectrum of potential users. The movement makes two assumptions:

- 1) that design is a powerful tool of social equality and influences each person's sense of independence, confidence, and control;
- 2) and that variation in human ability is ordinary, not exceptional, and affects most of us at some point in our lives.

Adaptive Environments offers educational programs, technical assistance, training, consultations, publications, and design advocacy. Our projects vary from local to international. We are a primary international resource for information on universal design and the host of Designing for the 21st Century, An International Conference on Universal Design. Adaptive Environments is also home to the New England Americans with Disabilities Act (ADA) and Accessible Information Technology Center. The Center is part of the national infrastructure created by the U.S. Department of Education to support voluntary compliance with the ADA. We provide technical assistance, training and dissemination of approved materials on the ADA to anyone requesting assistance from the six New England states.

We believe the Muddy River Restoration project process contains key opportunities for influencing decisions about human-centered aspects of the space. We seek to mitigate the negative consequences of neglecting a user-centered perspective of the Restoration. Adaptive Environments feels that this is especially important in the East

374 Congress St
Suite 301
Boston, MA 02210
(617) 695-1225 V/TTY
(617) 482-8099 FAX
www.adaptenv.org
adaptive@adaptenv.org

Board of Directors

Michelle Abadia
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Executive Director

Valerie Fletcher

Adaptive Environments

and West Fenway because of the concentration of elderly and disabled residents who use the Back Bay Fens park system. While we emphasize the concentration of this population in this neighborhood, we also believe that designs with these residents in mind are beneficial to all people, and that such designs are better for everyone.

Our categorical comments, suggestions, and questions follow:

On page 6-6, the objectives for the future management structure of the Public/Private partnership includes:

(6) Providing a safe, comfortable and positive environment for the public throughout the system for all seasons.

We are excited by the proposals of additional management structures to create uniformity for enforcing standards across the park system and its various organizations. This is especially useful for maintenance of accessibility and usability of pedestrian areas. There are several issues that relate to objective 6 in the management context:

- 1) The Draft Maintenance Plan, the section on "Workload Associated with Higher Standards" includes priority areas related to the above objective on cleaning and on erosion control. However, it does not include a single priority area related to pathway maintenance. In fact, the only mention of pathways in the document is in reference to cleaning paved surfaces under Recommended Park Maintenance Standards. The tables that follow these recommended standards refer to "Soft Surfaces," but nothing is marked for the Back Bay Fens which has gravel paths that must be maintained for wheelchair accessibility (significant number of wheelchair users in the Back Bay Fens). Also, the page 6-22, "Sample Maintenance Log" has no reference to pathway inspection. There is one mention on page 6-34 that "Correction of eroded stream banks and pedestrian trails should be completed following storms of large magnitude to prevent further erosion." Non-concrete paths erode gradually, not just after major storms, and such paths need more regularly monitoring in order to maintain ADA compliance.
- 2) The pedestrian bridges in the Back Bay Fens need to be made fully wheelchair accessible. These are significant connectors for West Fens residents to go to the Orange and Green lines (the Fenway, Kenmore Station, Hynes, and Symphony stations are all currently inaccessible but the MFA stop and the Ruggles stop are accessible). These bridges are used to get to the MFA, Northeastern, Wentworth Institute of Technology, and Mass College of Art. Currently, wheelchair users must take long, circuitous routes to get to the accessible T-stops on the other side of the Park.
- 3) Not every aspect of the Historic Olmstead Design is desirable. For example, at the intersection of Agassiz Road and The Fenway on the South side, the paved path connections are no longer sensible. The current path from Agassiz intersects in a T-shape with The Fenway path. There are several problems
 - a) The majority of foot traffic crosses Agassiz rather than going South along the Fenway. Those going South take a lower path. This leads to people who

Adaptive Environments

cross Agassiz to wear a path off to the side rather than walking to the T-shape.

- b) Those people going between Agassiz and the southern section of the Fenway, take the lower pathways rather than walking all the way to the T-shape on the Fenway.
- c) In the winter, plow crews plow the worn dirt section, not the T-intersection because it is not obvious that the path veers. A tree also overhangs low over the paved part.

These three issues form the basis of our recommendations for the proposed partnerships:

- 1) An explicit maintenance plan is needed to maintain ADA compliance of non-paved pathways. Costs and hours must be evaluated for fulfilling this specific function. } 4.1
- 2) An explicit maintenance plan is needed to maintain ADA compliance of paved pathways in the Winter. Costs and hours must be evaluated for fulfilling this specific function. Currently, the West and East Fens become disconnected for wheelchair users and some elderly residents in the Winter because park pathway cleaners plow all of the snow into the curb ramps. } 4.2
- 3) Back Bay Fens pedestrian bridges must be made ADA compliant } 4.3
- 4) An evaluation must be made of the original Olmstead networks that re-assesses the wisdom of path orientation given current usage patterns. User-centered design requires updating that design as the users change. Historic Rehabilitation should be evaluated in this context. } 4.4

In addition:

- 5) It is now a legal obligation to provide textural markings on curb ramps. Detectable warnings assist the visually impaired (85% of vision-impaired people have some kind of vision). This affects seniors especially. Recommended surfaces now have domes at a wider spacing than those recommended during previous ADAAG recommendations. This makes them usable by people with manual wheelchairs. The new ADAAG recommends that domes shall have a diameter of 0.9 inch (23 mm), a height of 0.2 inch (5mm), and a center-to-center spacing of 2.35 inches (60mm). The truncated dome surface shall contrast visually with adjoining walking surfaces either light-on-dark, or dark-on-light. The material used to provide contrast shall be an integral part of the truncated dome surface. Pedestrian crossings must include tactile warning at the bottom of each curb cut. We highly recommend textural surfaces on all curb ramps. } 4.5

Here is information the architects can use to investigate detectable surfaces to use: <http://www.access-board.gov/news/ROWguide.htm>

Adaptive Environments

- 6) Updates or additions of benches should be a mix of choices. We recommend that benches have a combination of styles - some with arms and some without. Benches with arms are needed for people with arthritis who have trouble rising. Benches without arms are useful to accommodate more people, such as a mother who stops with her baby and small children, or for people who want to lie down in the sun for a temporary break. Diversity of designs is key to meeting the diverse needs of diverse users.

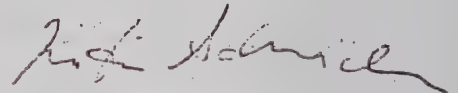
4.

Thank you for consideration of our comments.

Sincerely,



Valerie Fletcher
Executive Director



Kristin Schneider
Project Coordinator

cc: Stephanie Pollack, Conservation Law Foundation
Councilor Michael Ross, Boston City Council
Kit Perkins, New Ecology
Antonia M. Pollack, Director, Environment Department, City of Boston
Stan Ivan, Chief Engineer, Boston Parks Department
Simon Auster, Emerald Necklace Conservancy
Emerald Necklace Citizens Advisory Committee
Stephen Spinnetto, Commission on Disabilities
Ann Hershfang, WalkBoston



Town of Brookline

Conservation Commission

Letter 5
AP5
Associates
Marian Lazar

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Werner Lohe, Esq., Vice-Chair
Kate Bowditch
Gail Fenton
Adam Kahn
Roberta Schnoor, Clerk
Randolph Meiklejohn

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APR 25 2003

MEPA

Secretary Ellen Roy Herzfelder
Executive Office of Environmental Affairs
251 Causeway St.
Boston, MA 02110
ATTN: MEPA unit

RE: FEIR EOE A # 11865

April 23, 2003

Dear Secretary Herzfelder,

The Brookline Conservation Commission has several comments regarding the Final EIR for the Phase I Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project.

Overall, as you know, we are very supportive of this project and are delighted that it has moved to this phase in the review process. The restoration of the Muddy River is but the first step in the Emerald Necklace Master Plan, and is a project we have worked towards, in cooperation with many others, for over 15 years. As the project moves into the permitting and final design phases, we expect to work closely with Boston Park and Recreation Department and Brookline Department of Public Works staff. In addition we will be in communication with elected officials from both communities, other committees, and the many members of the public who are working on this project to ensure that it is successful and that all possible efforts are made to minimize and mitigate the environmental impacts that such a large-scale dredging project can be expected to have. We have specific comments on two sections of the FEIR.


Our first area of concern, Section 4, Wetlands Protection Act and Water Quality Certification Compliance, raises the issue of permitting for the project. The proponents feel that some portions of the project can be permitted directly by local conservation commissions as a limited project, as defined in the DEP's WQC Regulations 310 CMR 10.53, while portions may require approval from DEP as a Variance project. The Commission is not able to take a position on this issue based on the information we have seen to date, but we are always concerned about the significant short-term impacts to wetland and water resources that dredging poses. We expect

5.1

the proponents will work closely with the Conservation Commissions and DEP as the permitting process evolves.] 5-1 ca

Our second area of concern, the long term success of this project, depends on adherence to the commitments being made to maintenance in the drainage infrastructure that carries runoff into the Muddy River and in the parks that surround the river. We expect the permitting agencies to impose requirements to address these maintenance commitments, and to enforce them. We also recommend that you define a clear and satisfactory advisory role for the Muddy River Restoration Project Maintenance and Management Oversight Committee. We appreciate the opportunity to provide comment, and look forward to your certificate.] 5.2
] 5.3

Sincerely,


Joanna B. Wexler
Chair

Cc: Erin Chute, Director of Parks and Open Space
A. Thomas DeMaio, Commissioner of Public Works

Pugsley, Arthur (ENV)

From: Cathleen Cavell [cathleencavell@hotmail.com]
Sent: Wednesday, April 23, 2003 12:46 PM
To: Pugsley, Arthur (ENV)
Cc: HMattison@aol.com
Subject: Comment letter on FEIR from Friends of the Carlton St Footbridge



CSF-FEIR secy
letter.doc

Dear Mr. Pugsley,

I also attach a copy on letterhead of the letter included below. Please bring this letter to the attention of the Secretary. Thank you.

Cathleen Cavell

April 23, 2003

Ellen Roy Herzfelder, Secretary
Executive Office of Environmental Affairs
251 Causeway St.
Boston, MA 02114
Attention: Arthur Pugsley, MEPA Analyst

Re: Phase 1 Muddy River Flood Control, Water Quality and Habitat
Enhancement, and Historic Preservation Project (EOEA #11865)

Dear Secretary Herzfelder,

I am writing on behalf of the Friends of the Carlton Street Footbridge, a group of Brookline neighbors and residents, to comment on the FEIR filed recently for the subject project, and specifically on the position taken by the proponents in that document concerning the restoration of the Carlton Street entrance to the Riverway portion of the project. The Friends further request that you take certain actions in your Certificate for the FEIR, as described in the final paragraph of this letter.

Your office's Certificate on the DEIR, issued in April 2002, stated, "This Certificate assumes that the Town of Brookline will act in good faith to expeditiously implement the elements of the Master Plan within its control, including the rehabilitation and reopening of the Carlton Street Footbridge." This provision was developed following the conclusion of consultant studies conducted by the Town which found that the bridge is structurally sound and eminently restorable, that it is an element of the Riverway Park, which is listed on both the State and National Register of Historic Places, that the bridge would be a strong candidate for state and federal grants that would make its restoration less expensive to the Town than demolition, and that reopening the bridge would not pose issues of public safety. It was also taken in light of a letter to your office from the Massachusetts Historical Society stating that the Carlton Street footbridge is an integral element of the Olmsted park system and that its demolition would have an adverse impact on the park.

In direct contradiction to your Certificate, the Brookline Board of Selectmen proposed a resolution to the May 2002, Town Meeting calling for the evaluation not only of rehabilitation of the footbridge, with and without provisions for handicap accessibility, but two alternatives: demolition and relocation. This evaluation was to include development of relocation options, cost estimation of all options, and consultation with the Massachusetts Historic Commission on the mitigation that would be

equipped if the Town were to demolish or relocate the bridge. As presented to Town Meeting, these alternatives were to be evaluated during the following year, resulting in the Board of Selectmen's recommendation of a preferred alternative to the Spring 2003 Town Meeting. The resolution proposed that the 2003 Town Meeting appropriate \$30,000 in the Town's FY04 capital budget for the costs of plans necessary to pursue the preferred alternative, including application for outside funding. On the strength of the Selectmen's recommendation, the 2002 Town Meeting narrowly favored this resolution over an article filed by us, the Friends of the Carlton Street Footbridge, calling for the bridge's restoration. In its subsequent response to your DEIR Certificate's requirement that the Town "expeditiously implement" the rehabilitation and reopening of the Carlton Street Footbridge, Brookline stated in its FEIR that it would carry out the program to evaluate alternatives recommended by the Board of Selectmen to Town Meeting.

In the intervening year, Brookline has not carried out the adopted resolution. As reported recently to the Selectmen, the Engineering Department has confirmed the costs of restoration and demolition estimated in its earlier consultant studies. It has developed an approach to adding handicap accessibility to the restored bridge and estimated the cost of this feature. It has studied the relocation of the bridge from the Carlton Street park entrance to the foot of Monmouth Court, finding that the lower grade at the latter location would impose very substantial costs for both the additional stairs required and the increased length of handicap ramping.

Despite receiving a letter from the Massachusetts Historic Commission in April 2002 requesting "that further documentation and proposed plans be submitted to MHC as early in the planning stages as possible so that all alternatives for its treatment may be considered," and despite continual reminders from the Friends of the Carlton Street Footbridge, Brookline has not consulted with the Commission. As a result, although the Board of Selectmen submitted an FY04 capital improvements budget that proposes \$30,000 for costs of planning and design associated with the bridge and \$90,000 in Town funds to support the capital costs of a preferred option, the Board of Selectmen has failed to bring forward a recommended option for the consideration of the Spring 2003 Town Meeting.

In this vacuum, the Friends of the Carlton Street Footbridge filed a petition warrant article (designated Article 12) for the 2003 Spring Town Meeting that asks the Town to utilize the \$30,000 in the FY04 budget to prepare an application for state and federal funds for the restoration of the Carlton Street entrance to the park, including the provision of handicap accessibility if this can be accomplished through a design that is compatible with the historic character of the bridge. A companion resolution was filed by greenspace advocates asking the Town to recognize the commitments it has made to restoration of the Carlton Street park entrance in the park system master plan and subsequent documents. In their hearing last week on Article 12, the Selectmen suggested that the \$30,000 in FY04 funds would instead be used to continue the Town's investigation of bridge alternatives, including potential additional relocation sites, and to initiate consultation with the Massachusetts Historic Commission on the litigation that would be required for demolition or relocation of the bridge. The Selectmen will not vote a specific recommendation on Article 12 until April 29, 2003.

The chronicle outlined above is that of a Town executive body indifferent to the commitments it has made to support the Muddy River Restoration Project, including the restoration of the Carlton Street park entrance. While eager to obtain state and federal funds for the project, the Town's leadership has taken elaborate steps to delay any action on park entrance restoration until after your FEIR Certificate could impose consequences for its failure to meet its commitments and to abide by the terms of the DEIR Certificate. In the face of this unfortunate record, the Friends request that your Certificate for the FEIR clearly restate your requirement that the park entrance be restored; establish a timeline for the Town to act, including the submission of an application for state or federal funds; identify remedies to be employed if the Town continues to thwart the agencies concerned with the park project and the Town's commitments to it; and develop a mechanism that insures your continued oversight of the Town's good faith.

6.1

Sincerely,

Cathleen Cavell, Co-Chair
Friends of the Carlton Street Footbridge

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BROOKLINE GREENSPACE ALLIANCE

Advocates for Our Greenspace Heritage

Letter to
AP

RECEIVED

APR 23 2003

MEPA

April 17, 2003

Ellen Roy
Secretary of Environmental Affairs
Executive Office of Environmental Affairs
251 Causeway St., Ste 900
Boston, MA 02114 -2119

RE: Muddy River Restoration Project, EOEA #11865

Dear Secretary Roy:

I am pleased to present comments from the Brookline GreenSpace Alliance on the Final Environmental Impact Report for the Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement and Historic Preservation Project, EOEA #11865.

The importance of this project cannot be under estimated. Years of deferred maintenance have led to the degradation of a nationally historic park system, and millions of dollars in damage have been caused by the flooding of the Muddy River. We are now in a position to correct the inadequacies of the past and move forward with Phase I of this historic project.

While we urge you to look favorably upon the FEIR, we have two primary concerns about the project. In order to protect the significant public investment in the park system, we believe there needs to be more explicit assurances that funding for best management practices and the long-term maintenance and management of the park are in place, even during challenging economic times. While the maintenance and management sections of the FEIR are much improved from the DEIR, there is no assurance that the funding needed to implement the BMPs and increased maintenance will be in place over the long-term.

Our second concern is that not enough attention has been given to the historic resources within the park system. We hope the work being done to restore the Emerald Necklace will respect the historic structures within the park system during the length of the project. We are concerned about the potential demolition or relocation of the Carlton Street footbridge by the Town of Brookline. This bridge has been designated as one of Massachusetts' ten most endangered historic resources by Preservation Massachusetts and is recognized as an integral part of Olmsted's vision for the park system. We urge you to seek assurances that the restoration of the bridge will be included in the project.

Thank you for the opportunity to comment on the Final Environmental Impact Report. We look forward to the day when the people of Massachusetts can once again be proud of this national treasure.

Sincerely,

Christina Oddleifson
Executive Director

Staff
Christina Oddleifson, Director
Board Members
Officers
Gene Mattison, President
Deborah Bowditch, Vice President
Brian Lazar, V.P.-Publications
Deirdre Buckley, Secretary
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D. Perry
Dorah Rivers
Jean Stringham
Ronnie Sydney
Weevers
Wald Weitzman
Member Organizations
Brookline Farmers' Market
Brookline Soccer Club
Brookline Village Coalition
Brookline Youth Baseball
Chestnut Hill Garden Club
Chestnut Hill Village Alliance
State Change Action Brookline
Park Playground Association
Neighborhood Association
Friends of Baylston Playground Assoc.
Friends of Brookline Reservoir
Friends of Carlton Street Footbridge
Friends of Clark Park
Friends of Corey Hill Park
Friends of Dane Park
Friends of Emerson Garden
Friends of Griggs Park
Friends of Hall's Pond
Friends of Hoar Sanctuary
Friends of Larz Anderson Park
Friends of Lawrence Park
Friends of Leverett Pond
Friends of Littlefield Park
Friends of Lost Pond
Friends of the Muddy River
Friends of the Old Burying Ground
Friends of Pierce Playground
Friends of Robinson Field
Friends of Sargent Pond
Garden Club of Brookline
Parks Association
Museum of Transportation
Brookline
Neighborhood Association
Putterham Garden Club
Olmsted's Waterway Coalition
Muddy Road-Corey Farms
Neighborhood Association
Washington Square
Merchants Association



Letter 8

AP

Town of Brookline Massachusetts

Park and Recreation Commission

John T. Bain, Chairman
Nancy O'Connor, Vice Chairman
Nancy Madden
Mary Dewart
Kathryn Link
Nina Brown
Robert Simmons

RECEIVED

April 22, 2003

APR 25 2003

MEPA

Ms. Ellen Roy Herzfelder
Secretary of Environmental Affairs
Attention: MEPA Office
251 Causeway Street, Suite 900
Boston, MA 02114

Dear Ms. Herzfelder,

The Brookline Park and Recreation Commission wishes to express its support for the Final Environmental Impact Report (FEIR) regarding the Muddy River Flood Control, Water Quality, Habitat Enhancement and Historic Preservation Project, EOEA No. 11865.

Appointed by the Board of Selectmen, the Park and Recreation Commission serves as a policy-making board responsible to the Town for providing high quality, well maintained parks and open space facilities. The Commission is responsible for the implementation and oversight of all major capital improvement projects in Brookline's park system, including the Emerald Necklace.

The Brookline Park and Recreation Commission is committed to ensuring the successful completion of this project as well as implementation of the recommendations for improved maintenance. The rich legacy of open space in Brookline necessitates the obligation of careful stewardship. Over the past several years, the Park and Recreation Commission has worked very closely with Town staff to implement capital improvements in both Olmsted Park and the Riverway and to secure a higher level of maintenance.

As the project proceeds, the Muddy River will be gradually restored to a fully functioning and more attractive park system. The parks will be more widely recognized for their historic and cultural value and will offer even more to residents and visitors than they do at present.

A tremendous amount of time and resources has gone into the development of the FEIR. We are hopeful that you will approve the FEIR so that the proponents may begin the project's extensive permitting and review process as soon as possible and the public may enjoy the benefits of such an exemplary restoration project.

Sincerely,

John Bain
Chairman



Charles River Watershed Association

RECEIVED

APR 25 2003

MEPA

Letter 1
AP

By Fax and Mail

April 23, 2003

Secretary Ellen Roy Herzfelder
Executive Office of Environmental Affairs
251 Causeway Street
Boston, MA 02114
ATTN: MEPA Unit

***Re: Phase I Muddy River Flood Control, Water Quality and Habitat
Enhancement, and Historic Preservation Project FEIR; EOEA # 11865***

Dear Secretary Herzfelder,

The Charles River Watershed Association (CRWA) has been involved in efforts to improve water quality and habitat conditions in the Muddy River for many years. The Muddy River is one of the few remaining tributary streams to the Charles River lower basin, and is a significant hydrologic and open space element of the watershed.

Created by Frederick Law Olmsted when the Charles River lower basin was still a tidal estuary, the Emerald Necklace park and river system was a marvel of engineering and landscape design. The drastic changes wrought by the construction of the Charles River dam, and the century of urbanization and development throughout the Muddy River's drainage area, have forever altered the Muddy River. Yet it remains a magnificent park and river system, and one well deserving of the enormous effort that has been underway to restore it.

The impacts of the proposed restoration project (Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project, EOEA # 11865, the "Project") will be significant. In the long term, these impacts will be extremely beneficial, both to the Muddy River itself, and to the Charles River, and CRWA fully supports this project.

Any dredging project, however, and certainly one of this magnitude, can be expected to have significant short-term impacts on a river system. Furthermore, a project of this scale, impact, and expense should only be undertaken if all possible measures are taken to prevent the reoccurrence of many of the problems that led to the current situation, in particular uncontrolled urban runoff and poor parkland and parkway maintenance.



CRWA has reviewed the Final Environmental Impact Report (FEIR) and offers the following comments to assist you and your staff in the environmental review process.

Summary

- **Dredging Impacts:** Important details need to be developed during the project design, and in the Department of Environmental Protection (DEP) and U.S. Army Corps of Engineers (ACOE) permitting processes, to ensure that dredging impacts are minimized and mitigated. We recommend additional silt curtains near the outlet of the Muddy River to be in place during all construction activities, as well as continuous turbidity monitoring of the Muddy River prior to its discharge to the Charles River until all dredging and stream bank restoration is complete and stabilized. } 9.1
- **Best Management Practices (BMPs):** Many details of the BMP Plan need to be finalized, and full implementation of the plan will take a number of years. Close coordination between project staff, water and sewer personnel, DEP, and the oversight committee (The Muddy River Restoration Project Maintenance and Management Oversight Committee (MMOC) are essential to keep the BMP program on track and effective.
- **Management and Oversight:** We ask that you require a Supplemental EIR for the Management Structure Section of the project, as we do not believe that this section of the FEIR adequately analyzes the alternatives, or that the preferred management alternative will protect the public investment or ensure that the long-term project goals are met. The independent oversight body developed during the MEPA review process, the MMOC, is a vital and integral component of this project. The management structure should reflect this and the proponents' commitments, both financial and substantive, should be included in the Memoranda of Understanding (MOU) and Agreement (MOA) that must be developed prior to the state releasing any funds supporting this project. The draft MOU and MOA should be included in the Supplemental EIR

Our comments by section follow.

1. Dredging and Sediment Management

The Muddy River discharges to the Charles River just upstream of the Harvard Bridge in the lower basin. This is one of the most heavily used river reaches in the nation, and every effort must be made to protect it from the adverse impacts of dredging. We ask that you require the installation of additional silt curtains near the outlet of the Muddy River, to be in place throughout any dredging activities on the Muddy River, and another permanent turbidity or TSS monitoring station downstream of such a device prior to the river's discharge to the Charles River. } 9.1 cont'd

The FEIR indicates that, based on the dredging experience at Charlesgate, a combination of hydraulic and mechanical dredging may be needed in some areas. Mechanical dredging has greater impacts, and although costs are generally lower than for hydraulic dredging, mechanical dredging was not selected as the preferred alternative during the DEIR review process because of these greater impacts. Mechanical dredging,

which requires much more dewatering of the river section, may require more complex mitigation efforts during the dredging process, especially to deal with wet weather situations. There is greater potential for sediment transport, resuspension of solids, and bank erosion with mechanical dredging.

The FEIR has not shown an analysis of the impacts of the mechanical dredging; nor has it discussed mitigation for mechanical dredging. Furthermore, significant planning for pollution prevention, sediment control, and environmental monitoring has been left to the contractor. We recommend that the proponents work closely with the TAC, the MMOC and the DEP to develop a detailed sets of guidelines for wet weather management; that only small sections of the river be dewatered for dredging at any time; and that a more extensive wet weather water quality monitoring and mitigation plan be established.

9.2

After dredging activities are completed, there is a significant risk of bank erosion. Banks that have been exposed during dredging must immediately be stabilized, using methods such as fiber mats and filter fabric, until bank restoration efforts are complete, and plant communities are sufficiently established to provide stabilization. Regrading efforts must also be managed to protect the river from eroding soils.

9.3

2. Wetland and Water Quality Impacts and Mitigation for Preferred Dredging Alternative

A significant impact of the dredging will be the removal of the large stands of *Phragmites* from the river. While removing these invasive species will further most interests of the Wetlands Protection Act, there is likely to be reduced Sediment and Toxicant Retention and Nutrient Removal, one beneficial function provided by *Phragmites*. These sediments, and the pollutants associated with them, cannot simply be allowed to pass on freely into the Charles River as a result of the removal of the *Phragmites* stands from the Muddy River. The proposed mitigation for the loss of this function relies heavily on the effectiveness of both structural and non-structural BMPs, as well as on the proposed in-stream sedimentation basins. We are concerned about the efficacy of this mitigation, especially as there is no quantitative data presented in the FEIR on the in-stream sedimentation basins. Ineffective mitigation could result in violations of water quality standards.

We ask that you require a more detailed monitoring program for the in-stream sedimentation basins to determine their impacts (see our comments under Environmental Mitigation and Section 61 Findings). We also ask that, should the quarterly water quality monitoring reveal that the goals for reductions in sediment loading are not being met, further BMPs be required. Monitoring results from the current BMP pilot program should be used (and augmented as necessary) to develop a pre-dredging baseline data set. These two mitigation measures are vital to offset the removal of the *Phragmites*.

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Significant erosion and bank destabilization can occur during bank and wetland restoration projects. Plans for minimizing these impacts, and mitigating those that do occur, must be developed in much greater detail as the project progresses. We suggest

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that DEP and MMOC staff work closely with the project proponents to develop effective, detailed plans that can be implemented by the contractors and monitored by the Independent Environmental Monitor, DEP staff, and the MMOC.

9.7 cont

3. Wetlands Protection Act and Water Quality Certification Compliance

CRWA's interpretation of the Wetlands Protection Act is that only small portions of the project, namely the dredging of the ponds in Olmsted Park, qualifies as a Limited Project, and the remaining portions of the project should proceed only under a Variance issued by DEP. This is primarily because one of the interests of the Act, namely pollution prevention, could be significantly adversely affected by the project. The potential for short-term impacts due to dredging is great, and the removal of the *Phragmites* stands may increase sediment transport out of the Muddy River into the Charles River (see comments on Wetland and Water Quality Impacts and Mitigation for Preferred Dredging Alternative above). A project with such potential impacts should be permitted only under strict DEP review and compliance requirements.

9.8

4. Watershed Evaluation and Best Management Practices

The FEIR was to contain significantly more detailed information on BMPs than it does. The length of time required to implement the pilot program has made this impossible, so there are still large information gaps in this section of the FEIR. We recognize that the structural BMP plan proposed in the FEIR is based on the incomplete data available to date, and that some changes to the plan will occur. Furthermore, like all operational maintenance programs, non-structural BMP implementation and maintenance is an ongoing process.

Nevertheless, the BMP program must have "measurable environmental performance standards"¹ and benchmarks. These standards should be based on targeted goals for sediment removal, and should not rely merely on predicted model results but on actual water quality sampling results.

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Monitoring the BMP program, measuring its success, and making recommendations for future improvements will be one of the most important roles of the MMOC. It is one of the reasons that we ask you to require the proponents to commit to including the MMOC in the project management structure

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5. Management and Maintenance

A. Management Structure

It is because of inadequacies in the Management Structure section of the FEIR that we ask you to require a Supplemental EIR (SEIR) for this project. Significantly, the MOA that will outline the management responsibilities of each of the project partners, and the MOU that will detail the funding responsibilities and commitments of the project parties, should have been included in the FEIR to allow for public review and comment. The MOU and MOA should be required inclusions in the SEIR. In addition, the MDC's commitments to its maintenance responsibilities, including BMPs, and financial obligations to meet these responsibilities should be included in both the MOU and MOA.

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¹ EOE # 11865 DEIR Certificate

We also support the minimum conditions for the MOA outlined by the Emerald Necklace Citizens Advisory Committee (ENCAC) in its comment letter.

9.12

The FEIR does not provide an adequate alternatives' analysis of management structures and therefore, does not properly comply with MEPA. Inexplicably, the proponents did not examine any park systems that cut across jurisdictional lines. There are examples of multi-jurisdictional park systems that should be examined as part of the review for this project. Both the Environmental Joint Powers Act and the Cabinet management alternatives appear to offer significant opportunities for a management structure that will offer "seamless management without jurisdictional barriers."² In contrast, the preferred management structure, which is singularly lacking in detail in the FEIR, seems to be little more than "a promise to cooperate" this time around. The SEIR should discuss in detail, specifically, the Environmental Joint Powers Act³ and the Cabinet management alternatives, as well as the management alternative proposed by the ENCAC. These three alternatives (and the current preferred alternative) should be discussed in the context of the "critical" criteria proffered by the proponents at p. 6-12 of the FEIR: ability to retain ownership and maintenance responsibilities, and ability to include administration of public and private funds. The MOA provisions, and how they would differ, should be discussed for each of the alternatives in the SEIR analysis.⁴ The SEIR should also contain a forthright discussion of the disadvantages of the preferred management alternative and how those drawbacks can be overcome.

9.13

In view of the extensive discussions that have already taken place between the ENCAC and the proponents on management structure, we believe your certificate on the SEIR should clearly and in detail scope the alternatives analysis for the proponents. We believe the starting point in that analysis should be the paramount duty of effective stewardship, and transparency and public accountability in decision-making for each of the alternatives analyzed in the SEIR.⁵ The proponents should also be required to discuss

9.14

² Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project Final Environmental Impact Report, p. 6-2.

³ We note that the proponents' rejection of a management structure created pursuant to the Environmental Joint Powers Act in part because it would require legislation after five years, does not appear to us to be sound. FEIR at p. 6-12. If the structure is successful during its five years in place, legislation would be the natural next step. The Environmental Joint Powers Act approach also has the built-in advantage of allowing for full evaluation of management after five years with the opportunity and flexibility to address the management structure as it evolves over time.

⁴ The proponents maintain that a "carefully crafted" MOA "gives the parties complete control over the terms to ensure that the commitments being made are in fact legal and in line with statutory authority regarding allocation of financial resources and personnel." FEIR at p. 6-12. The proponents should explain this statement in the SEIR, and why this would conflict with the alternative management structures. We do not believe that the parties, as presently proposed, should be ceded complete control over the terms of the MOA.

⁵ Not all criteria should be weighted equally. For instance, while approval by the City Council or Town Meeting might be required for some alternatives, this should not be a drawback and certainly should not be given the same consideration as the over-arching criteria of effective stewardship.

a mechanism for resolving disputes and for enforcing maintenance commitments for each of the alternatives.

If, ultimately, a model similar to the current preferred alternative is selected as the management structure, the MMOC should have a clearly defined and participatory role in this. The MMOC should participate in the planning and policy meetings to "review progress ... and establish goals and programs for succeeding years."⁶ We do not believe the preferred management structure in the FEIR provides a "structure and function"⁷ that will allow the MMOC to function as intended. CRWA is a member of the ENCAC and we join in its comments on the FEIR regarding the inclusion and proper role of the MMOC in the management structure.

9.15

We understand the importance of moving forward on this project; however, we do not believe that a limited continuation of the MEPA review process will cause any delay in the project. Given the current project schedule, which includes significant permitting and planning obligations, the preparation of a SEIR to address inadequacies in the Management Structure section of the FEIR should not impact the schedule.

9.16

B. Maintenance Plan

The Maintenance Plan section provides details for the significant and important reporting plans for this project. These reports, however, must be based on the performance standards, which are yet to be articulated. These standards should be developed, with input from the MMOC, prior to the issuance of DEP permits for this project, and prior to the release of state funding for the project. We suggest that, as stated under Watershed Evaluation and Best Management Practices above, reports show progress relative to these performance standards and that deadlines for adopting performance standards be included in the MOA. Further, we recommend that the annual BMP Plan report be expanded to include the volume of sediment removed from catch basin cleaning programs and street sweeping programs.

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In general, maintenance is one of the most difficult aspects of any public parkland program. The investment of time and money in this project must be protected by a permanent change in maintenance programs, both in the parklands, and in the storm drainage systems that flow into the Muddy River. The MMOC is the best way to ensure that the maintenance commitments articulated in this section are carried out.

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6. Environmental Mitigation and Section 61 Findings

The potential for short-term water quality impacts during dredging are significant. As stated above under Dredging and Sediment Management, this is an area of the project with many incomplete details. Furthermore, there are potential long-term impacts of the project to the Charles River if the BMP program is not successful.

9.21

⁶ Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project Final Environmental Impact Report, p. 6-11.

⁷ EOE # 11865 Final Phase I Record of Decision, July 29, 2002

If the in-stream sedimentation basins are to be part of the project, significant monitoring of their performance should be made. So little data and information about these basins exists that we have been unable to make an informed decision about the long-term benefits of these as a BMP. Yet a lot of the project's effectiveness, especially at replicating the sediment trapping ability of the *Phragmites* stands, is based on their success. CRWA feels it is worth trying these experimental BMPs if there is a real commitment made to studying and reporting upon their success. Such a study should include regular monitoring as is suggested in Section 10, plus similarly designed baseline monitoring in a nearby location of the river. Additional monitoring should be done immediately after a large storm, such as a 1-year or 10-year storm to see whether all of the sediment is in fact merely washed out during large storm events.

9.22

Monitoring and mitigation during the project implementation will be critical. The Independent Environmental Monitor who will be hired should work closely with the MMOC's Administrator in the field to support the MMOC's oversight responsibilities. All pollution prevention plans, and all data collected as part of the mitigation effort should be shared with the MMOC.

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Once again, we are in full support of this project, and believe it will provide long-term benefits to the region. The open public review process serves to make this a better project, and one we are all proud to participate in. We thank you and your staff for your efforts on behalf of a better future for the Muddy River.

Sincerely,



Margaret Van Deusen
Deputy Director and General Counsel



Kate Bowditch
Senior Environmental Scientist and Policy Analyst

cc: Jim Hunt, Director, MEPA
Betsy Shure Gross, EOE
Steve Lipman, DEP
Erin Chute, Brookline Parks and Open Space
Margaret Dyson, Boston Parks and Recreation Department
Simone Auster, Emerald Necklace Conservancy
Emerald Necklace Citizens Advisory Committee
Muddy River Restoration Project Maintenance and Management Oversight Committee

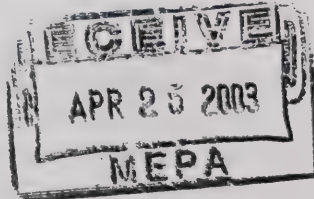


COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Metropolitan Boston – Northeast Regional Office

Letter 10

MITT ROMNEY
Governor

KERRY HEALEY
Lieutenant Governor



ELLEN ROY HERZFELDER
Secretary

EDWARD P. KUNCE
Acting Commissioner

April 24, 2003

Ms. Ellen Roy Herzfelder, Secretary
Executive Office of Environmental Affairs
251 Causeway Street, Suite 900
Boston, MA 02114
Attn: MEPA Unit

RE: EOE A #11865, Final Environmental Impact Report

Dear Secretary Herzfelder:

The Department of Environmental Protection (DEP) has reviewed the Final Environmental Impact Report (FEIR) submitted jointly by the Boston Parks and Recreation Department and the Brookline Department of Public Works for the Phase I Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project (EOEA #11865). This letter is intended to convey DEP's consolidated comments.

Many of the comments contained in this letter have been discussed in meetings with the proponents and their consultants or were contained in DEP's comments on the DEIR. As discussed more specifically below, the DEP is not satisfied with the FEIR's response to a number of our concerns. We respectfully request that a Supplemental FEIR be required by MEPA. This comment letter follows the format of our previous letters and is divided into the major sub-headings of issues that fall under DEP's jurisdiction or oversight, these being: (1) Wetlands Protection Act (WPA); 2) 401 Water Quality Certification; 3) Dredging and Sediment Management; and 4) Stormwater Management and Pollution Control.

Wetlands Protection Act

Back Bay Fens

1. In Section 4.3.1, the FEIR states that bank-to-bank dredging of Back Bay Fens and Riverway qualifies for limited project status under 310 CMR 10.53(4) because the work will enhance the natural capacity of the resource area. As stated in our comments on the DEIR, it is DEP's opinion that dredging of the stream channel and the removal of invasive plant species in the Back Bay Fens are likely to qualify for limited project status due to the documented need to improve flood control capacity in this segment of the River. However, DEP understands that the

10.1

This information is available in alternate format. Call April McCabe, ADA Coordinator at 1-617-556-1171.

205A Lowell St. Wilmington, MA 01887 • Phone (978) 661-7600 • Fax (978) 661-7615 • TTD# (978) 661-7679

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dredging in the Charlesgate area was more extensive than originally anticipated. Therefore, we request that the proponents provide a re-analysis of the flood control model using the as-dredged conditions in Charlesgate in order to verify whether the proposed dredging in the Back Bay Fens is still necessary to achieve the desired level of flood control. DEP may revise its opinion pending review of the analysis.

10.1
cont

The Riverway

2. On page 2-11 and in numerous other sections of the FEIR, it is clearly indicated that, other than in Back Bay Fens and three sections in the Riverway, the River has sufficient capacity for flood control. In Section 3.3.2, the FEIR states that the bank-to-bank dredging is "intended to restore flood flow capacity where [*Phragmites*] impede flow." The FEIR goes on to state that "bank-to-bank dredging is proposed to eradicate this plant from the river corridor." DEP finds these two statements to be in conflict. In Section 3.3.4.1, the FEIR notes that *Phragmites* block the channel in several locations, specifically the Back Bay Yard, the Island Bridges near Netherlands Road and Brookline Avenue. Selected dredging to remove *Phragmites* or accumulated sediment where flood flows are impeded could qualify for limited project status under 310 CMR 10.53(4) and possibly would meet the criteria for a Variance. However, documentation of the proposed dredging of the entire Riverway "bank-to-bank" is not adequate to meet the limited project criteria. The FEIR does not show that the proposed project will enhance wetland functions above and beyond what currently exists. The FEIR also states that full dredging of the Riverway would qualify for a Variance, but no specific information, including an alternatives analysis, is provided about how the work would meet the criteria. It is DEP's opinion that, based on the documentation available to DEP, the proposed dredging of the Riverway does not qualify for limited project status and does not meet the criteria for a Variance.

10.2

10.3

The Ponds

3. The dredging proposed in the three ponds, Leverett, Willow and Wards, can qualify for limited project status under 310 CMR 10.53(4) so long as the dredging is limited to the removal of accumulated sediments and restoration of the functions of Land Under Water. Alteration of Bordering Vegetated Wetlands (BVW) and Bank must be avoided or minimized and any altered BVW must be replicated around the pond that it was associated with. Replication of BVW downstream in Back Bay Fens, as currently proposed, is not permissible. Furthermore, the proposed construction of "sedimentation basins" within these water bodies is not permissible under the Wetlands Protection Act.

10.4

Phragmites Removal

4. The FEIR acknowledges the sediment-removal and stabilization functions being performed by the *Phragmites*. Removal of the *Phragmites* will, in DEP's opinion, improve flow capacity by reducing friction during medium and high flow events. In order for its removal to play a beneficial role to the river, sediment loading to the river must be reduced, flow must be increased at all locations where the river ponds up (such as the inlet under the former Sears Parking Lot), areas where *Phragmites* are removed must be stabilized to a higher level and whatever is used to stabilize the sediment must have a lower Manning's frictional coefficient than the *Phragmites*. Unless these conditions can be met, it is the Department's opinion that removal of the *Phragmites* is unlikely to improve water quality. Of particular concern for bank and river bottom stability is the removal of *Phragmites* from the outside curve of each meander belt. Flows are

10.5

typically higher on the outside curve, causing bank scour. The existing stands of *Phragmites* are causing water to flow more slowly through these sections and are anchoring the sediments, leading to less scour. Once the plants are removed, water will flow faster through these sections, which will lead to increased scour unless the soil is anchored to a higher degree than the *Phragmites* can anchor it.

10.5
cont.

In-stream sedimentation basins

5. In Section 3.3.4.2, the FEIR proposes to use the in-stream sedimentation basins to compensate for the sediment removal function currently being performed by the *Phragmites*. The Department disagrees that the in-stream sedimentation basins will perform the same sediment removal function as the *Phragmites*. The FEIR states in Section 4.4 that the in-stream sedimentation basins meet the limited project criteria or qualify for a Wetlands Variance. It is the Department's opinion that the basins cannot be approved under the limited project provisions and that they will not meet the criteria for a Variance.

10.6

Wetland Alteration and Replication

6. The amount of BVW alteration and any proposed replication in the Back Bay Fens is still unknown, according to Section 3.3.1 of the FEIR. The FEIR states that work will occur "within" 0.4 acres of BVW but does not state whether this is an alteration that will be restored in place or will be replicated elsewhere. In the Riverway, grading of the channel will result in the loss of 0.1 acres of BVW. The FEIR does not state where replication for that loss will be located.

10.7

7. The FEIR states that daylighting of the River in two locations offers the potential for the creation of BVW. However, none is currently proposed. DEP strongly recommends that BVW creation be an integral part of the daylighting effort in order to provide habitat and a functional riverine area. DEP notes that the DEIR proposed to create BVW along the new streams.

10.8

8. Wetland replication areas should be located, constructed and monitored in accordance with the Department's Inland Wetland Replication Guide, 2002.

10.9

9. The plans for the project should indicate the square footage of all wetland alteration, restoration and replication.

10.10

401 Water Quality Certification

In-Stream Sedimentation Basins

10. A major proposed element of the stormwater treatment program is the creation of in-stream sedimentation basins designed to, "...trap sediment discharged with storm water at major outfalls and other areas to slow water velocity to prevent continued sediment transport." (FEIR 2-14). On page 4-11 of the FEIR the project proponents further state that, "The overall dredging project is designed to improve the capacity of the river to provide flood control and storm damage prevention. These basins will neither further improve nor diminish the improvement provided by the dredging project and are therefore considered to have a neutral impact on these two interests."

10.11

The regulations governing the discharge of dredged or fill material, dredging and dredged-material disposal in waters of the Commonwealth, 314 CMR 9.00, state that, "*No discharge of dredged or fill material is permitted for the impoundment or detention of stormwater for purposes of controlling sedimentation or other pollutant attenuation. Discharge of dredged or fill material may be permitted to manage stormwater for flood control purposes only where there is no practicable alternative and provided that best management practices are implemented to prevent sedimentation or other pollution.*" (314 CMR 9.06(5)). The proponents do not claim that the purpose of the sedimentation basins is for flood control. In fact, they state that the basins will have a "neutral impact" on flood control. The expressed purpose of the basins is to "trap sediment discharged with storm water." The regulations prohibit the discharge of dredged or fill material for the impoundment or detention of stormwater for purposes of controlling sedimentation; thus, the dredging associated with the creation of sedimentation basins is not a permissible element of the project.

10.11
cont.

Dredging of BVW and Bank in the Ponds

11. The necessity of dredging or excavating BVW and Bank in the three ponds has not been supported by the information contained in the FEIR. All applications for dredging require that the proponent demonstrate that the project has been designed to avoid impacts to such resource areas. If impacts cannot be avoided, they must be minimized. Without more specific information regarding the need for bank-to-bank dredging in the ponds, it is the Department's opinion that there are opportunities to reduce impacts by restricting dredging to the accumulated sediment, leaving the existing BVW and Bank intact.

10.12

pH of the Lime-Stabilized Pressate to be Discharged to the River

12. Per 314 CMR 4.05(b)(3), the pH of pressate to be discharged to the river must be treated to reduce the level to between 7 and 8.3, not 7 and 9 as proposed.

10.13

Water Quality Monitoring Program

13. It was noted in the FEIR that the same water-quality monitoring plan is proposed for work in all of the segments of the river, regardless of sediment chemistry. The proposed monitoring program developed for Charlesgate, which is amongst cleanest of the segments, was based on the types and concentrations of contaminants found in the sediment of that specific area. The Department will require that the water-quality monitoring program(s) be tailored to address the conditions that occur in each area, given the suite of contaminants found. The program(s) should be based on the results of sediment and elutriate testing and should include both organic and inorganic contaminants as well as appropriate physical parameters.

10.14

14. Aside from an adjustment of pH, the FEIR makes no reference to the potential need for treatment of water proposed to be discharged to the river. Given the levels of contaminants found in the sediment, the Department will impose limits on the levels of contaminants that may be discharged to the river during dewatering operations. It is possible that the discharged water will require treatment to meet water quality standards. The treatment may be as simple as serial filtration or may require additional measures, such as the use of granular activated carbon.

10.15

15. The proposed frequency of once-per-week monitoring of water discharged to the river may be inadequate. It is likely that at least daily monitoring will be required in the early stages of the

10.16

project to ensure that water quality standards are being met. Once the treatment system's ability to discharge water in compliance with limitation imposed in the 401 Water Quality Certification is documented, the frequency of monitoring may be reduced.

10.16 cont.

Polymer Toxicity

16. A copy of the acute toxicity testing performed on the polymer proposed for use should be included among the 401 permit application materials, along with chronic toxicity testing of the polymer, if available.

10.17

Sediment Management

Pre-dredge debris field clearance

17. DEP strongly recommends specific preconstruction review and assessment of this issue so that permits and bid documents will adequately address the need for clearance of debris, cobbles and boulders. The FEIR states that additional sediment testing will be performed "during design" and the results will be used to re-evaluate whether hydraulic dredging is feasible. DEP suggests that preconstruction sampling with a backhoe or other appropriate method be performed. On page 2-5, the FEIR mentions the use of a "jetting ring" as an option. DEP is concerned about the use of this technology given the level of contamination in the fine sediments. The text also states that cobbles and boulders may be allowed to remain in the river provided that enough fine-grained material is removed to achieve the required depth. DEP suggests that since this is a significant issue, a small working group should be established to discuss and review the results of any additional sediment sampling to determine the appropriate dredging technology(ies) and the management of any oversized materials.

10.18

18. The Department agrees with the statement on Page 2-7 that in-state landfills are not considered to be a likely reuse or disposal option.

19. Section 2.6.3: Lime may be necessary for reactive sulfide control and not just odor control.

10.19

20. Section 2.6.5: DEP concurs with the proponent that the use of in-situ sampling data to classify sediment for reuse/disposal would certainly be advantageous. We also agree that the contractor will have to provide for post-dredging sampling contingencies. DEP will review the final staging area plans and layout to ensure that such a contingency is practicable.

10.20

21. Page 2-25: In the first sentence after the boxed-table, add to the end of the sentence, "or for any disposal option."

10.21

22. Phragmites removal: On page 3-21, the FEIR states that "the root mat and attached above-ground stalks will be disposed of with the dredged sediment." It was DEP's understanding from the DEIR that the proponents would attempt to handle the root mat/stalks separately from the sediment so as to reduce disposal costs. The vegetation (after some cleaning) could be dealt with as regular solid waste. This is of particular concern as it relates to areas of TCLP-Lead sediment.

10.22

23. Page 4-7: In DEP's comments on the DEIR, we asked for the report by the ACOE entitled, "Biological Impacts for Dredging Justification." This report was never received. It appears from the FEIR that the report is unpublished but available. 10.2

24. Page 5-23: The FEIR suggests approaching the Massachusetts Turnpike Authority (MTA) to consider installation of a particle separator on its stormwater flows that enter the Muddy River. It should be noted that as part of the CA/T Project, DEP and MTA have agreed to a post-construction comprehensive stormwater management plan, part of which will involve the installation of numerous Stormceptor units. If the proponent decides to approach MTA, we suggest they contact the personnel at the CA/T Project who are very familiar with these technologies. 10.24

25. Section 6.7.2, Corrective Measures: The rationale for using a storm event of 4 inches of precipitation in 24 hours should be explained. The definition of a "large event" should also be supplied. 10.25

Stormwater Management and Pollution Control

WATERSHED EVALUATION AND BMPs (Section 5):

Summary

Based on a review of Section 5 of the FEIR, it is DEP's opinion that the proposed stormwater controls are inadequate to reduce sedimentation and improve the degraded water quality conditions to the degree that is anticipated. The estimates of load removal potential are too high and the evaluation of the watershed loading appears to have been based on poorly substantiated data. The estimate of a 62 percent load reduction from source controls does not appear to be justifiable. From the modeling, it is unclear that Combined Sewer Overflow (CSO) loading is included in the baseload estimates, given that only nonpoint loading information is presented. However, the load reduction plan takes credit for improvements that will reduce CSO loads. In addition, source control credit has been taken for catch basin cleaning, which inflates the load reduction potential of the stormwater BMP plan. DEP considers catch basin cleaning to be a maintenance activity. This means that sediment removal credit is already included in the BMP removal rating, and that this reduction is actually counted twice.

Stormwater Management Policy and Surface Water Quality Standards

26. The redesign of a stormwater management system in the highly urbanized Muddy River Watershed will be limited by land availability and competing use constraints on potential sites. Even though it may be impracticable to capture and treat 80 percent of the total suspended solids (TSS) annual load to the river, it is not clear why the goal for the stormwater design plan is not more in line with the water quality standards in the Stormwater Management Policy for redevelopment projects and the Massachusetts surface water quality standards in order to promote restoration of the waterbody's designated uses. In view of these state standards, more justification is needed for the project goal of only 30 percent TSS removal by 2006. 10 26

27. Recognizing that the system will not be able to capture and treat all runoff, a practical strategy would be to target for treatment the primary nonpoint sources of the sediment loads to

the Muddy River from the largest drainage catchment areas. With knowledge of contributing watershed sources, it should be possible to select and design the system to optimally reduce contamination by using the most suitable structural and nonstructural best management practices (BMPs). However, the following facts raise doubts that this has been done:

- ✧ The FEIR has not isolated the source originations of the sediment baseload;
- ✧ There is little variation in the proposed treatment of runoff; particle separators of unspecified design are the preferred BMP for most of the watershed areas that can accommodate BMPs;
- ✧ Other structural BMP designs with broader contaminant removal capabilities are proposed for only limited applications, even though the recommendations in the lower Charles River Basin study by the Center of Watershed Protection were for greater use of bioretention and sand filters within the Muddy River watershed. If land availability restricts the use of these BMPs, consideration should be given to innovative treatment, filtration and infiltration technologies that typically would require less land area. It also would not be appropriate to eliminate sediment traps and forebays that are providing pretreatment for sand filters and infiltration systems (5-14);
- ✧ The reason for eliminating 29 sites, and selecting only 5 sites for structural BMPs has not been explained well;
- ✧ Structural BMPs, other than particle separators, will only treat runoff from 17 acres of the watershed (Table 5-9);
- ✧ There is limited information to support the design selection on those few sites; and
- ✧ The plan for using nonstructural BMPs is not specifically associated with sources of higher pollutant loads. For example, the frequency of street sweeping could be tiered to require more frequent sweeping on roads with higher volumes and that require more deicing treatments, where pollutant loads are higher.

10.27
cont.

28. The Muddy River is categorized as an impaired waterbody on the 2002 *Integrated List of Waters* for the preparation of a total maximum daily load (TMDL). Considering that the river is impaired for priority organics, metals, elevated nutrients, organic enrichment, low dissolved oxygen, sedimentation and pathogens, wider use of a variety of BMPs as components in on-and-offline treatment train systems could improve the entire system's effectiveness for capturing and treating a variety of contaminants in the stormwater runoff.

10.28

29. If a decision is made to use an innovative stormwater technology for which a Strategic Envirotechnology Partnership (STEP) report is unavailable on the STEP Website, www.stepsite.org, the performance capabilities of that technology will need to be demonstrated in accordance with Appendix D in the Stormwater Management Handbook, Volume Two, <http://www.state.ma.us/dep.brp/stormwtr/stormpub.htm>. In view of this, the pilot program scope for evaluation of particle separators should be reconsidered to ensure that it covers the requirements in Appendix D.

10.29

Construction Site and New Development Controls (Section 5.4.1.3)

30. The NPDES Phase I and II programs regulate construction activities for land disturbances of one (1) acre or more. Within the Muddy River drainage, except for institutional development such as the nearby colleges, land disturbances smaller than one acre are more likely given that this area has already been densely developed. Given that infill development will likely be occurring on parcels less than an acre in size, reliance strictly upon the NPDES Phase I and II

10.30

programs to control construction site runoff will most likely not provide meaningful reductions in sediment runoff. Construction site runoff from all sites, regardless of size, must be controlled in order to realize a reduction in sediment runoff.

31. The town of Brookline is required to comply with the new NPDES Phase II Storm Water permit requirements. Given that there are common elements in Phase II requirements for a storm water management program and the "*Workplan for Implementation and Maintenance of Basin Wide Non-Structural Best Management Practices (BMPs)*," (Appendix B), it is recommended that the town's management program be reviewed to avoid duplication and to take advantage of opportunities to strengthen both plans. 10.31

Water Management Model

32. A realistic estimate of the total annual TSS loading is essential baseline information for designing the structural and non-structural BMP plan to achieve the annual load reduction goals. The Watershed Management Model (WMM) was used to calculate the 2500 cubic yards per year annual TSS load to the Muddy River. However, the relevance of this loading value to the Muddy River Watershed needs to be demonstrated by providing the following information.

1. Documentation is needed to support the event mean concentrations (EMCs) in Table 5-4. Many of the values are significantly higher than the EMCs used in the EPA NURP and Rouge River Watershed (Michigan) studies. The EMCs for wetlands and water exemplify the problem: both are low relative to other land uses in these studies, but wetlands are given the highest EMC value in Table 5-4. Are the EMCs based on local conditions or have default pollutant concentrations used? If defaults were used, was model calibration done with sampling data from the Muddy River Watershed to adjust the model for local conditions? 10.32
2. The area of each land use type, A_L should have been provided in Table 5-4 to make the table more understandable. For example, with acreage data it might be possible to understand why the forest/rural open category is included in the table for an area that is predominantly urban.
3. An explanation and/or listing of the conversion factors used to compute the load in cubic yards per year should be provided. The load equation 5-1 in the FEIR indicates that the pollutant load should be reported in pounds per year per acre.
4. Reconsideration should be given to the referenced load equation, based on model documentation that multiplies the load factor M_L by the acreage, which is different from the computation in the referenced equation.

The WMM model has the capacity to use inputs on the baseflow CSO pollutant loadings; however, this information has not been included with baseflow stormwater pollutant concentrations in the FEIR (Table 5-4). The FEIR should have made it clear that CSO load reductions are a reduction of existing CSO loads, given that a 34 percent TSS removal credit has been taken for elimination of CSO load in Stony Brook Conduit. As presented, it appears that 10.33

CSO load reductions are an offset of stormwater runoff loads, which would have the effect of inflating the attainable sediment load reduction.

10.33

33. The potential effectiveness of the structural BMPs, in terms of their contribution toward achieving the sediment load reduction goal, is difficult to comprehend. Presumably, the FEIR is indicating that 38 percent of the 30 percent load reduction goal will be removed by these BMPs. However, the report did not provide sediment removal ratings for the BMPs or percentage of the watershed that will be captured and treated by them. A table comparable to Tables 5-5 and 5-6 should have been included for these structural BMPs to show their individual annual sediment reduction estimates.

10.34

EMCs Used in Water Management Model (Section 5.3.4.1)

34. DEP disagrees that "wetlands" cause more sediment loading than parking lots, transportation uses, highway uses, etc. (see Table 5-4). If this were true, natural wetland areas not fed by runoff from other sources would be filling up with sediment. Instead the wetlands that are silting-in most quickly are those into which urban runoff is directed.

10.35

Sediment Sources

35. The sources of sediment flowing into the river were not specifically identified in the FEIR. In order to have an effective source reduction program, the specific sediment sources must be identified. The Water Management Model (see section 5.3.4.1) does not estimate the sources of the sediment – for instance it does not take into account road sanding and construction site runoff. It assumes the same amount of sediment loading regardless of whether construction is taking place in the basin or whether there is a more severe winter than usual.

10.36

Catch Basin Cleaning (section 5.3.1, Table 5-1 and 5-5, and 5.4.1.1)

36. Cleaning of sediment accumulated in catch basins is not a source control activity – it is a maintenance activity. Examples of sediment source control activities are measures to stabilize land surfaces to prevent erosion and reducing or eliminating road sanding in the winter. The catch basin cleaning practices are described as "aggressive" for the Year 2000 (see page 5-2). It is DEP's experience that they are less than aggressive and simply represent the average cleaning frequencies most Massachusetts municipalities employ. Section 5.4.1.1 estimates that an 80 percent reduction may be realized for twice annual cleanings. This 80 percent reduction is not supported by research reviewed by DEP and far exceeds the efficiency used in the stormwater policy. The DEP stormwater policy presumes that a 25 percent reduction of TSS can be achieved with deep sumps with cleanings 4 times a year. The cleaning method also should be specified, as vacuuming is more efficient than clam shell buckets. To achieve a more meaningful TSS removal rate, all catch basins discharging to the Muddy River should be cleaned a minimum 4 times per year, if not more, unless the proponent can quantify the actual loading rate and guarantee sediment will be removed prior to each sump becoming half full (assuming deep sump catch basins with a minimum sump depth of 4 feet). Development of a customized cleanout schedule may mean that some catch basins, those which receive the highest sediment loadings, will need to be cleaned out on a more frequent basis, certainly more than the once every two to three years that is proposed.

10.37

Street Sweeping (Section 5.3.1.3)

37. The 10 percent TSS reduction for street sweeping is only for aggressive street sweeping programs with stabilized land surfaces utilizing high efficiency vacuum sweepers. Infrequent sweeping, rotary brush sweepers and sweeping of areas with unstable shoulders will only result in a small fraction of TSS removal, if even that. A recent study conducted by USGS in cooperation with the Massachusetts Highway Department (MHD) found 0 percent TSS reduction from street sweeping on a portion of the Central Artery (most likely because of the soft unstabilized shoulders of that portion of the roadway which contributed a continuous source of sediment to the roadway). In the Route 140 project, MHD proposed once a year street sweeping and DEP awarded them a TSS removal credit of less than 1 percent as part of our Wetlands Variance decision.

10.38

Pilot Program (Section 5.3.3)

38. The pilot program for collection of TSS and oil and grease samples must follow the protocol established by Massachusetts through the Technology and Acceptance Reciprocity Partnership (TARP) in order for the results to have any scientific meaning. A strict Quality Assurance Plan (QAP) must be established. The QAP must identify the methods to be used to analyze TSS and oil and grease (there are different methods), and the distribution method to which the data is fit must be identified. The TARP requires 15 storms at a minimum. Also, assessment in the winter will skew the results, so winter analysis should not be included. For instance, since precipitation typically falls in the form of snow, qualifying storms in the winter may generate little runoff, or if they do, sands and other sediment may be bound up in snow and may only reach inlets in small quantities. For more information on the TARP protocol, the proponent should contact Nancy Baker in DEP's Northeast Regional Office and on the web at: <http://www.dep.state.pa.us/dep/deputate/pollprev/techservices/tarp/>

10.39

Source Control Recommendations (Section 5.4.1)

39. The source control program consists of annual water quality sampling, improved street sweeping, trail maintenance, public education, water fowl control, catch basin labeling, improved enforcement of pet waste laws and construction site controls. It is DEP's opinion that these controls will not significantly reduce sediment loads. For instance, annual water quality sampling will not result in any sediment removal. Also, as no details were presented regarding the proposed annual sampling, it is difficult to judge whether it will be a meaningful sampling program. Sediment that flows to the Muddy River originates from unstable land surfaces (construction sites, bare soil, etc.) and application of sand to roadways and parking lots in the winter. Therefore, to reduce the sediment source, measures must be undertaken to aggressively implement erosion controls on construction sites, bare soil areas must be landscaped and winter sanding operations must be restricted or perhaps eliminated. The sediment reduction from street sweeping is minimal because other than the streets controlled by the City of Boston and the MDC, no changes to the cleaning frequency is proposed. Greater reductions could be realized by increasing the sweeping frequency and switching over to more efficient sweepers. It is essential to reduce sediment loading because the structural BMPs proposed may only be effective at trapping sediment from certain sized storms. It is likely that sediment trapped in those BMPs will be resuspended and discharged to the Muddy River, given the infrequent maintenance that is being proposed for catch basins and other BMPs. More frequent maintenance will result in permanent removal of the sediment.

10.40

BWSC Controls on New Development and Redevelopment (section 5.4.1.3)

40. More elaboration is needed regarding the proposal to "retain stormwater on site." For instance, does this mean that 100 percent of the stormwater runoff needs to be infiltrated? For the particle separators to be placed in new or redeveloped parking lots exceeding 7,500 square feet, does this mean these particle separators will discharge to infiltration galleys and not into municipal drainage structures? If not, particle separators are generally not effective in removing large volumes of sediment due to the short retention time stormwater is typically held. Also, their removal efficiency is a function of the cleaning frequency, and no cleaning frequency was proposed. Particle separators typically only remove the larger sediment fraction and not fines such as silts and clays. As with catch basins, the more often they are cleaned, the more efficient they are.

10.41

Evaluation of Additional Sites (Section 5.4.3.2)

41. Of the 60 sites evaluated, other than the particle separator sites, only 5 were found to be feasible to support structural BMPs. A table should be presented to DEP of every site evaluated and the reason why it was rejected. Of the 5 sites left, a commitment needs to be made to construct and maintain the treatment systems. Open and closed treatment systems such as the ones discussed in the FEIR (Sand Filters, Dry Swales, and Bioretention) are much more effective at removing sediment from the first flush volume than particle separators. More locations for open treatment and sand filter systems should be evaluated.

10.42

Particle Separators (Section 5.4.3.4)

42. As discussed in other comments above, particle separators are not as efficient as open treatment and sand filter systems at removing sediment, since particle separators have a shorter retention time, are easier to short circuit and are less likely to remove fines such as silts and clays. Although they do have the advantage of being able to be placed below streets, other new technologies that are more efficient at removing sediment, such as filter systems, have this same advantage (Stormwater Management Inc. is one such technology that employs filter cartridges). Of interest is that the swales and sand filters which research indicates are much more efficient in removing sediment of all sizes are only attributed to remove one percent of the required load, whereas the less efficient particle separators are projected to remove 37 percent of the required load. This suggests that a larger drainage area is being directed to the particle separators or that a greater removal rate is projected for the separators than they may actually achieve. DEP recommends that more open treatment systems, sand filters and filter systems be employed and fewer particle separators.

10.43

Stony Brook Conduit (Section 5.5.2)

43. Repair of the Stony Brook conduit is proposed to remove 34 percent of the sediment needed to be removed. This high percentage needs to be justified, given that it appears more likely that there is a bacteria reduction, rather than a sediment load reduction.

10.44

Muddy River Bed Load (no section number)

44. Rivers maintain channel capacity through bed load erosion of the land over which the river flows. If bed load is reduced, rivers in some cases may become shallower because less scour occurs. The Muddy River needs to be evaluated to make sure that if sediment loading reductions

10.45

do occur, that appropriate bed load is still discharged to the river to maintain the channel. Without taking bed load into account, there could be an unintended consequence of the river silting in faster than projected.

10.45 cont

Maintenance (Section 6.0)

45. The maintenance of the channel, culverts, and stormwater treatment units is general in nature and needs to be further refined. As mentioned above, the catch basin cleaning program proposed appears to be inadequate.

10.46

Alternatives and Contingency Planning

46. DEP continues to believe that an alternative project scope that includes Phragmites removal for wetlands enhancement and selected dredging in the Back Bay Fens and Riverway to restore flood flows would be feasible and would accomplish many of the goals of the project.

10.47

The Department of Environmental Protection appreciates the opportunity to comment on the FEIR. Please contact Rachel Freed at (978) 661-7783 or Steven Lipman (617) 292-5698 if you have any specific questions or comments regarding this correspondence.

Sincerely,



John Felix
Deputy Regional Director

cc: Margaret Dyson, Boston Parks and Recreation
Tim Famulare, Boston Conservation Commission
Samantha Overton, MDC
Henry Woolsey, Natural Heritage and Endangered Species Program
U.S. Army Corps of Engineers, Regulatory Division
Lester Lewis and Richard Thibedeau, EOEA
Jane Mead and Deerin Babb-Brott, CZM
Cynthia Giles, Michael Stroman, William Gaughan, Madeline Morris, James Sprague,
Yvonne Unger, John Carrigan, Kevin Brander, Rachel Freed, Steven Lipman and
Eric Worrall, DEP

22 Arborway
Jamaica Plain, MA 02130

April 24, 2003

Ellen Roy Herzfelder, Secretary
Executive Office of Environmental Affairs
Att'n: MEPA Office
EOEA No. 11865, MEPA Analyst Arthur Pugsley
251 Causeway St.
Boston, MA 02114

Re: Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project (EOEA #11865)

Dear Secretary Roy Herzfelder:

We have followed this important project with great interest for some time. Flood control and water quality issues are paramount, but are not our areas of expertise. Therefore, our comments will be in reference to the habitat enhancement and historic preservation aspects of the project.

The internationally acclaimed Emerald Necklace park system is one of the Commonwealth's most treasured historic landmarks. Any projects or developments present opportunities to strengthen Frederick Law Olmsted's historic design intent and to repair past damage. The waterways, parkways, landscape and structures are all vital parts of the park system. Its historical and cultural significance is well documented. In addition, there are important social and physical benefits from having an intact linear park with multiple safe and convenient connections. Safe access to and through the parks is central to Olmsted's vision of parks as places where people could easily come to get away from the stresses of urban living and enjoy the landscape, the vistas and social interactions.

Sedentary living has resulted in a growing obesity epidemic that places a tremendous emotional and financial burden on individuals, members of families, employers and the health care industry through the resulting diseases such as diabetes, high blood pressure, cardiovascular disease, cancer and others. Pedestrian and bicycle paths with safe street crossings are necessary in order to encourage physical activity through recreational use of this linear park. Disruption to these paths or points of access during this project must be kept to a minimum, with expeditious return to public use as a high priority. The state has already made a commitment to the goals of safe and convenient connections by funding the Emerald Necklace Greenway Project (through the Department of Environmental Management's Trails and Greenways program) and the Arborway Master Plan (through DEM's Historic Landscape Preservation program).

Unfortunately, one potential point of access, the Carlton Street Footbridge in Brookline, has been involved in a lengthy study process, followed by a plan for *further* study. Section 6.9.4 of the FEIR requires the Proponents to maintain character-defining features, including structures providing site entries, circulation systems, views and

} 11-1

vistas. The Footbridge provides *all of the above* and therefore is an important part of the whole.

Another recreational site that will be disturbed as a result of this project is Daisy Field in Jamaica Plain. This well-utilized ball field is planned to be the staging area for work at Leverett Pond, Willow Pond and Ward's Pond. It is important for this work to be scheduled in a way to minimize the seasonal conflict with the sports schedule and with awareness of the strong desire in the community to regain access to the field as soon as possible.

11-2

This project acknowledges the Emerald Necklace as a "system of integrated parks and parkways" with specialized maintenance issues. It is Olmsted's "most ambitious undertaking involving landscape architecture, metropolitan planning and engineering." (FEIR section 1.2.1) In describing Best Management Practices in Section 5.5.1, the FEIR (page 5-27) states the intent to "Repair drainage system and curbs along roadways (Back Bay Fens and Riverway)". Does this plan include drainage and curbs along the Jamaicaway (adjacent to Leverett Pond, Willow Pond and Ward's Pond) and the Arborway? The parks and parkways are integrated, and their maintenance must also be integrated.

11-3

Sincerely,

Sarah E. Freeman and Sam Sherwood



April 23, 2003

Ellen Roy Herzfelder, Secretary
Executive Office of Environmental Affairs
251 Causeway St.
Boston, MA 02114
Attention: Arthur Pugsley, MEPA Analyst

Re: Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project (EOEA #11865)

Dear Secretary Herzfelder,

I am writing on behalf of the Friends of the Carlton Street Footbridge, a group of Brookline neighbors and residents, to comment on the FEIR filed recently for the subject project, and specifically on the position taken by the proponents in that document concerning the restoration of the Carlton Street entrance to the Riverway portion of the project. The Friends further request that you take certain actions in your Certificate for the FEIR, as described in the final paragraph of this letter.

Your office's Certificate on the DEIR, issued in April 2002, stated, "This Certificate assumes that the Town of Brookline will act in good faith to expeditiously implement the elements of the Master Plan within its control, including the rehabilitation and reopening of the Carlton Street Footbridge." This provision was developed following the conclusion of consultant studies conducted by the Town which found that the bridge is structurally sound and eminently restorable, that it is an element of the Riverway Park, which is listed on both the State and National Register of Historic Places, that the bridge would be a strong candidate for state and federal grants that would make its restoration less expensive to the Town than demolition, and that reopening the bridge would not pose issues of public safety. It was also taken in light of a letter to your office from the Massachusetts Historical Society stating that the Carlton Street footbridge is an integral element of the Olmsted park system and that its demolition would have an adverse impact on the park.

In direct contradiction to your Certificate, the Brookline Board of Selectmen proposed a resolution to the May 2002, Town Meeting calling for the evaluation not only of rehabilitation of the footbridge, with and without provisions for handicap accessibility, but two alternatives: demolition and relocation. This evaluation was to include development of relocation options, cost estimation of all options, and consultation with the Massachusetts Historic Commission on the mitigation that would be required if the Town were to demolish or relocate the bridge. As presented to Town Meeting, these alternatives were to be evaluated during the following year, resulting in the Board of Selectmen's recommendation of a preferred alternative to the Spring 2003 Town Meeting. The resolution proposed that the 2003 Town Meeting appropriate \$30,000 in the Town's FY04 capital budget for the costs of plans necessary to pursue the preferred alternative, including application for outside funding. On the strength of the Selectmen's recommendation, the 2002 Town Meeting narrowly favored this resolution over an article filed by us, the Friends of the Carlton Street Footbridge, calling for the bridge's restoration. In its subsequent response to your DEIR Certificate's requirement that the Town "expeditiously implement ... the rehabilitation and reopening of the Carlton Street

Footbridge", Brookline stated in its FEIR that it would carry out the program to evaluate alternatives recommended by the Board of Selectmen to Town Meeting.

In the intervening year, Brookline has not carried out the adopted resolution. As reported recently to the Selectmen, the Engineering Department has confirmed the costs of restoration and demolition estimated in its earlier consultant studies. It has developed an approach to adding handicap accessibility to the restored bridge and estimated the cost of this feature. It has studied the relocation of the bridge from the Carlton Street park entrance to the foot of Monmouth Court, finding that the lower grade at the latter location would impose very substantial costs for both the additional stairs required and the increased length of handicap ramping. Despite receiving a letter from the Massachusetts Historic Commission in April 2002 requesting "that further documentation and proposed plans be submitted to MHC as early in the planning stages as possible so that all alternatives for its treatment may be considered," and despite continual reminders from the Friends of the Carlton Street Footbridge, Brookline has not consulted with the Commission. As a result, although the Board of Selectmen submitted an FY04 capital improvements budget that proposes \$30,000 for costs of planning and design associated with the bridge and \$90,000 in Town funds to support the capital costs of a preferred option, the Board of Selectmen has failed to bring forward a recommended option for the consideration of the Spring 2003 Town Meeting.

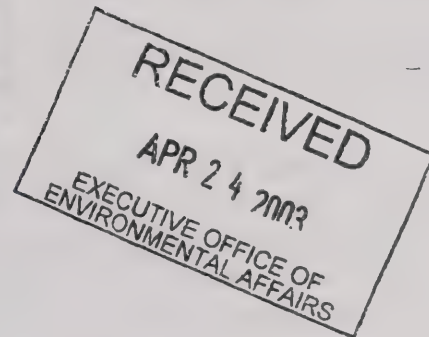
In this vacuum, the Friends of the Carlton Street Footbridge filed a petition warrant article (designated Article 12) for the 2003 Spring Town Meeting that asks the Town to utilize the \$30,000 in the FY04 budget to prepare an application for state and federal funds for the restoration of the Carlton Street entrance to the park, including the provision of handicap accessibility if this can be accomplished through a design that is compatible with the historic character of the bridge. A companion resolution was filed by greenspace advocates asking the Town to recognize the commitments it has made to restoration of the Carlton Street park entrance in the park system master plan and subsequent documents. In their hearing last week on Article 12, the Selectmen suggested that the \$30,000 in FY04 funds would instead be used to continue the Town's investigation of bridge alternatives, including potential additional relocation sites, and to initiate consultation with the Massachusetts Historic Commission on the mitigation that would be required for demolition or relocation of the bridge. The Selectmen will not vote a specific recommendation on Article 12 until April 29, 2003.

The chronicle outlined above is that of a Town executive body indifferent to the commitments it has made to support the Muddy River Restoration Project, including the restoration of the Carlton Street park entrance. While eager to obtain state and federal funds for the project, the Town's leadership has taken elaborate steps to delay any action on park entrance restoration until after your FEIR Certificate could impose consequences for its failure to meet its commitments and to abide by the terms of the DEIR Certificate. In the face of this unfortunate record, the Friends request that your Certificate for the FEIR clearly restate your requirement that the park entrance be restored; establish a timeline for the Town to act, including the submission of an application for state or federal funds; identify remedies to be employed if the Town continues to thwart the agencies concerned with the park project and the Town's commitments to it; and develop a mechanism that insures your continued oversight of the Town's good faith.

Sincerely,

Cathleen Cavell, Co-Chair
Friends of the Carlton Street Footbridge

MUDDY RIVER RESTORATION PROJECT



April 23, 2003

Ms. Ellen Roy Herzfelder
Secretary of Environmental Affairs
Attention: MEPA Office
251 Causeway Street, Suite 900
Boston, MA 02114

RE: Emerald Necklace Environmental Improvement Master Plan and Phase 1 Final
Environmental Impact Report, Muddy River Flood Control, Water Quality, Habitat
Enhancement and Historic Preservation Project, EOEA No. 11865

Dear Secretary Herzfelder,

While it might be somewhat out of the ordinary for Project Proponents to participate in an EIR Comment Period, we want to take the opportunity at this important milestone to reaffirm the Proponents' commitments to the Phase I Muddy River Restoration Project as initially outlined in the MOU of June 8, 1999. In dollar terms alone, \$500,000 has already been allocated for Phase I by the Town of Brookline, and \$1,500,000 by the City of Boston. A significant portion of these funds have been expended.

Additional capital commitments were further set out in a letter from the Brookline Board of Selectmen on April 4, 2002⁴⁴ and are included in the Town's FY04 Financial Plan. Boston's commitments were also expressed in a letter from Mayor Menino dated June 25, 2002. These commitments are similarly reflected in the 2004 Capital Plan for the City of Boston. Of course, beyond these financial commitments the Proponents have completed significant structural and landscape improvements in the Muddy River park and watershed.

Like all other cities and towns, the Proponents are under enormous budgetary stress. State Aid in particular is being severely reduced in unprecedented fashion. Yet despite these cutbacks, the Proponents intend to sustain their budgetary commitments which were made originally upon the assurance of federal and state funding distributed in conformance with established formulas.

In light of these commitments, the Proponents are very concerned that a Supplemental FEIR will be suggested by others participating in the Comment Period. The Proponents believe that a Supplemental FEIR will have a significant adverse impact on this Project. Substantial progress was made in many areas of the Project between the filings of the DEIR and the FEIR, through discussion with your office and other involved parties, such as the Muddy River Project Maintenance Oversight Committee (MMOC). There is more than ample evidence to suggest that

any remaining outstanding issues can be resolved through productive dialogue, without the issuance of a supplemental FEIR.

It is our belief that two issues in particular - the Management Structure, and the Carlton Street Footbridge, can be resolved without a Supplemental FEIR.

As set forth in the requirements of the Phase I Final Record of Decision (FROD) for the Charlesgate portion of the Muddy River Project, the Proponents created a new management structure for the parks. The new management structure, a public-private partnership ("The Partnership"), was created for the purpose of managing the Emerald Necklace as a unified park system. The Proponents believe strongly that the management structure as proposed meets the requirements as set forth in the FROD and the DROD. More importantly, imposing change in the structure of what has been proposed could create an untenable situation for the Proponents, resulting from conflict about the role of the MMOC and other parties.

This Project falls under the jurisdiction of many regulatory agencies, and these regulators will impose a set of legally binding, specific regulatory performance standards to which the Proponents must adhere. The MMOC is intended to serve as an independent voice, separate from the property managers (including The Partnership) and regulators to review compliance with all the permits and commitments to which the Proponents have agreed. The ability of the MMOC to serve as an independent oversight body is a critical component of the assurance the public needs to become comfortable with this substantial investment by state, federal and local dollars. To perform this function, the MMOC must remain in an independent advisory role. It would be extremely difficult, if not impossible, for the MMOC to provide this independent oversight if it also becomes a member of the management Partnership.

The MMOC has voiced a desire to better define their role as this Project moves forward. The Proponents believe this Project should in fact move forward, while clarifying the role of the MMOC with direction from your office and without a Supplemental FEIR.

The second issue of concern relates to the Town of Brookline's commitment to the restoration of the Carlton Street Footbridge, which is not included in Phase I of the Master Plan. Even though the Footbridge is not part of Phase I, the Town has taken extensive action to address the Footbridge. This Project has proceeded through its review and approval process as would any Town project. This has entailed much discussion over several Brookline Town Meetings. In fact, several more warrant articles related to the Footbridge were submitted for consideration at this spring's Annual Town Meeting. Brookline has always had great respect for the right of its citizens to comment, participate and vote on important issues through the Town Meeting format. This adherence to the Town Meeting process should not be interpreted as a lack of commitment to the Emerald Necklace Master Plan. There are clear indicators of the Town's commitment to resolve the issue of the Carlton Street Footbridge in the FY04 capital budget. Despite the budget cuts, \$120,000 has been set aside in this year's capital plan to move forward with the Footbridge, whenever and if Town Meeting deems it appropriate.


Concentrating on one specific project of the many set forth in the Emerald Necklace Master Plan and using it to measure the Town's commitment to the Phase I Muddy River Restoration project

ignores the depth and scope of the overall commitment that has been demonstrated. The allocation of funds for the restoration of the Footbridge in the Town's budget, coupled with the commitment of the Town to continue deliberating the issue in the Town Meeting process, clearly reflects the Town's overall commitment to both the Emerald Necklace Master Plan and to the Muddy River Restoration Project.

Moreover, the Secretary's Certificate on the DEIR already addresses the MMOC's concern regarding any purported change in the Town's commitment to restore the Footbridge. The Secretary found that the Footbridge is historically significant and is an integral component of the Olmsted Park System. The Secretary outlined the required procedure that must be followed if there is any change in the Town's commitment to rehabilitate and reopen the Footbridge. The Certificate on the DEIR requires that under such circumstances, at a minimum, the Town must file a Notice of Project Change to the Muddy River Project. Any changes with regard to the Footbridge would be reviewed by the Secretary, and would include the opportunity for public comment, through the NPC procedures. The Secretary indicated in the Certificate on the DEIR that the alternatives analysis "would certainly include a requirement to study a no-action alternative and an alternative that involves rehabilitation of the footbridge." Because the Secretary in the Certificate on the DEIR has already addressed the MMOC's concerns regarding the restoration of the Footbridge, it is not necessary to require the submission of a Supplemental FEIR.

The Proponents look forward to working together with your office, the Muddy River Project Maintenance and Management Oversight Committee and with all our Project partners on this exciting Project. We urgently recommend that this be allowed to happen without the issuance of a Supplemental FEIR.

Sincerely,

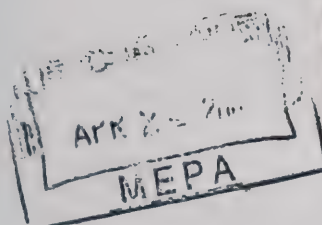


A. Thomas DeMaio
Town of Brookline
Commissioner of Public Works



Antonia Pollak
City of Boston
Acting Commissioner, Boston Parks
Department

Cc: Governor Mitt Romney
Jim Hunt, MEPA Director
Arthur Pugsley, MEPA Office
Congressman Barney Frank
Mayor Thomas Menino
Representative Michael F. Rush
Representative Frank I. Smizik
Representative Jeffrey Sanchez
Representative Brian Golden
Senator Cynthia Creem
Nancy Daly, Brookline Advisory Committee
Betsy Shure Gross, Executive Office of Environmental Affairs
Margaret Dyson, Director of Historic Parks, Boston Parks and Recreation
Howard Liebowitz, Mayor's Office
Vincent Mannering, Boston Water and Sewer Commission
Thomas Brady, Conservation Administrator
David Turner, Town Counsel
Emerald Necklace Citizen Advisory Committee
Muddy River Maintenance and Management Oversight Committee



BOSTON GREENSPACE ALLIANCE

April 22, 2003

Executive Committee

Ali Noorani, President
John Copley, Vice President
Kendra Stensven, Treasurer
Molly St. Clair, Clerk
Veronica Eady, at large
Ruth Feldman, at large
Samantha Overton Bussell, at large

Ellen Roy Herzfelder, Secretary
Executive Office of Environmental Affairs
Attention: MEPA Office
Arthur Pugsley, EOEa No. 11865
251 Causeway Street, Suite 900
Boston, MA 02114

Board of Directors

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Wataru Matsuyasu
Pearl Mosley
Ali Noorani
Molly St. Clair
Kendra Stensven
Andrea Taaffe
Susan Worgoffik

Re: Final Environmental Impact Report – Phase I Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project. EOEa #11865

Dear Secretary Herzfelder:

On behalf of the Boston GreenSpace Alliance, a citywide open space advocacy organization dedicated to connecting all people to their parks and green spaces, I am pleased to offer the following comments on the Muddy River Flood Control, Water Quality and Habitat Enhancement and Historic Preservation Project Final Environmental Impact Report (EOEA FEIR # 11865).

The Alliance has long been active in supporting continued restoration, enhanced management and consistent and appropriate maintenance for the Emerald Necklace Park System; e.g. creation of the Emerald Necklace Conservancy was an Alliance sponsored initiative. The Alliance is an active member of the Emerald Necklace Citizens Advisory Committee, and since October 2002, the Alliance has served also on the Muddy River Restoration Project Maintenance and Management Oversight Committee (MMOC).

There is much at stake with the Muddy River Restoration Project. Its ability to provide much needed improvements to the Emerald Necklace park system and infrastructure represents a unique opportunity for the City of Boston. As there are no real precedents we can look to of the same scope and historical significance, it is critical that the criteria and systems developed for the project be of the highest quality, safeguarding the asset in both the short and long term. The public must be assured that its considerable investment in the Muddy River Project will be preserved and enhanced into the future when new citizens will take up the work so arduously undertaken currently by many dedicated advocates who, in cooperation with the proponents, are working to

develop effective and enforceable long term mechanisms for public participation and oversight.

An icon of the city, the Emerald Necklace constitutes 50% of Boston's park system. Therefore, practices established through the Muddy River Restoration Project will serve as a model and set a standard for all other parks in the city. It will also establish criteria for developing plans for the other parks within the Emerald Necklace system. It is critical that the maintenance and management structures established through this process allow for meaningful participation from all of the stakeholders within the system, providing for equal opportunities for decision-making and community involvement. The concerns of the Alliance are predicated on this belief.

FEIR Section 6

Throughout the Alliance's involvement with the Emerald Necklace/Muddy River Restoration Project, the organization has looked to the proponents to establish appropriate mechanisms to resolve issues of deferred maintenance in the park system while developing the ability to protect the asset in the future. Therefore, in our letter on the Draft EIR to the Secretary, dated April 8, 2002, we focused our comments on maintenance and management issues. Many of the issues voiced in that letter remain relevant and consequently one year later, maintenance and management continues to be a concern for us. We remain concerned about how to most effectively address the years of deferred maintenance in the park system and believe that the role of an independent oversight committee (MMOC) is critical to ensuring that the public investment be protected. While the Alliance supports and applauds the proponents in their efforts to realize this most unique and ambitious project, we believe a guarantee for meeting performance standards over the long term is contingent on the Muddy River Restoration Project Maintenance and Management Oversight Committee (MMOC) functioning in its intended role as described in the secretary's FROD of July 29, 2002¹. We see that the MMOC must be independent and have access to decision making and policy setting processes, by being an integral part of a maintenance/management structure.

We note that there are two related issues that remain to be resolved. One is the management structure itself and the question of whether the model proposed in the FEIR by the proponents is the best and most efficacious; and the second is the question of capacity and ability of the proponents to fulfill their obligations to strengthen and enhance project and park system maintenance in light of the history of years of deferred park system maintenance.

The Alliance is additionally concerned about the current fiscal climate and the effect that budget cuts suffered by the city and state will have on creating more deferred maintenance. How will critical maintenance get done? In the FEIR, the proponents appear not to have addressed the challenge as becoming more substantial with the budget cuts. A fairly large gap already exists between current maintenance practices and the real needs for the future.

¹ The MMOC "...will participate in the development of performance standards and review benchmarks to monitor progress; provide independent review on a periodic basis to evaluate efforts to meet the project goals, including long-term maintenance and management goals, monitor and evaluate compliances with the provisions of federal, state and local permits and approvals; and promote close coordination or project activities among Boston and Brookline agencies, the MDC, and the MBTA". (Page 8, FROD July 29, 2002).

However, despite the enormous challenges, the proponents must meet their maintenance/management responsibilities.

MMOC

It is critical that a maintenance/management structure be developed that responds appropriately to the Secretary's directives – in its current format it is unclear that this has been fulfilled. The establishment of the MMOC was not a negotiable point but rather a condition of the Secretary's certificates of decision (DROD, April 16, 2002 and FROD, July 29, 2002). However, in the FEIR the role of the MMOC² remains peripheral to the activities of the described maintenance/management structure. We believe this relationship needs to be strengthened if the proponents are to comply fully with last year's certificates, which require a meaningful role for an "independent oversight committee" that will "represent the full range of stakeholders". A potential role for the MMOC would be to monitor the proponents' compliance with the MOA once it is developed. This would move the MMOC from a solely "advisory capacity" to an oversight role, guaranteeing a level of accountability that can only be achieved through an independent entity. 14.2

The proponents describe a public-private partnership as the selected management structure for the project stating that "Public-Private partnerships can take many forms depending on the relationship and involvement of the relevant parties" (p.6-14). In addition, they go on to state that the "Public-Private partnership would be based on a carefully prepared Memorandum of Agreement outlining the roles, responsibilities and procedural interactions of the parties." (p.6-15). Without that memorandum created and available for review, it is difficult to assess the long-term effectiveness of this mechanism.

Because the Emerald Necklace is a complex system of interrelated parks with distinct issues and supporters for sub-sections, the range of interested stakeholders for the project is large. To be effective, the public-private partnership model chosen for the project would require a broad base of stakeholders, as the Secretary directs, to provide meaningful oversight of the project. The public-private partnership model might need to be expanded to include participants other than those outlined in the FEIR to accommodate these diverse stakeholders. 14-3

As it stands, without a detailed MOA, we find it difficult to comment on a document that promises good solid work but does not show us how it will happen; nor does Section 6 describe with enough detail the roles and functions of each participant in the proposed management structure. Therefore, it is difficult to support the creation of this structure when the details of responsibility are not clearly outlined. For example, what would happen if the proponents cannot come to an agreement of terms?

With what we see in the FEIR, everything is contingent on the development and signing of an MOA that is not available for review. Once developed the MOA will need to be overseen and monitored. In fact, the existence of an MOA in the FEIR would make it even more critical that the MMOC be put into place as the body that ensures the proponents comply with the MOA.

² Referred to in the FEIR as the EIC (Environmental Improvements Committee)

We see progress made since last year yet still look for a clear commitment from the proponents that through their proposed maintenance/management structure the public investment will be adequately protected. An annual update to the MMOC is not the best mechanism to evaluate whether prior financial, management and maintenance commitments have been met. The MMOC must have an ongoing and significant role in maintenance/management oversight with the ability to hold the proponents to standards that can be publicly reviewed and discussed. The integration of the MMOC into a maintenance/management structure will allow the development of measurable outcomes and will create a format in which broader participation can ensure project success. 14-4

Without a clearly defined commitment to a maintenance/management structure that includes the MMOC in a meaningful way the project may not become the shining example it could become.


Historic Resources Section 7

We sadly note that it appears the proponents have yet to work with the Mass. Historical Commission – as directed last year by the Secretary - on the very critical issues regarding historical resources. It is our fervent hope that this will be resolved in the near future. 14-5

The Alliance wants to emphasize its strong support for a truly unique and important project but continues to have concerns about the future maintenance and protection of a vast public investment and the lack of concrete plans for historic resources. Therefore we join with the ENCAC in asking that a Supplemental EIR be required to address the above concerns, including the development of a detailed MOA.

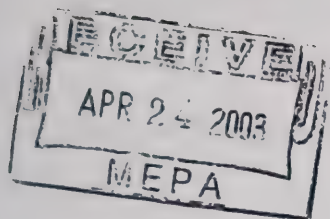
The Boston GreenSpace Alliance appreciates the opportunity to offer comment on the Muddy River Flood Control, Water Quality and Habitat Enhancement and Historic Preservation FEIR.

Sincerely yours,



Patrice A. Todisco
Executive Director





Emerald Necklace
Citizens Advisory Committee

April 24, 2003

Secretary Ellen Roy Herzfelder
Executive Office of Environmental Affairs
251 Causeway Street
Boston, MA 02114
ATTN: MEPA Unit

RE: Phase I Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project FEIR; EOEA # 11865

Dear Secretary Herzfelder:

The Emerald Necklace Citizens Advisory Committee (ENCAC) is submitting this comment letter on the Final Environmental Impact Report (FEIR) for the Muddy River Phase I project. The ENCAC has appreciated the opportunity to work with the Executive Office of Environmental Affairs and the Proponents of this project to continue to improve this important undertaking.

For the purpose of commenting on the FEIR, the ENCAC has broken down its comments and concerns by sections. While we remain very supportive of the overall project, the ENCAC has remaining concerns with Sections 5, 6, 7, and 10 of the document. These concerns are outlined in this letter.

The ENCAC offers its comments in the spirit of cooperation with the Proponents and in the belief that this remarkable and unique project will provide use, enjoyment, and respite of the citizens of Boston, Brookline and all of Massachusetts for generations to come.

Yet, as the Secretary Durand noted in his certificate last year based on public comments received on the DEIR, "... no issue generated as much concern as maintenance and management (and the related issue of Best Management Practices)". Because the ENCAC agrees that "developing an appropriate maintenance program and management structure for the Muddy River project will prove critical for protecting the public investment being made,"¹ we are compelled to recommend that a Supplemental Environmental Impact Report (SEIR) be required to ensure that the project will achieve optimal success. We reach this conclusion primarily but not exclusively because of the inadequate management structure and maintenance plan proposed in Section 6 of the FEIR.² We are confident that with an adequate and enforceable maintenance/management plan in place, the Muddy River Restoration Project will fulfill its project goals and protect the substantial public investment.

15-1

¹ April 16, 2002 DEIR Certificate, page 7.

² See also FEIR Section 7 comments.

The complete comments of the ENCAC on each section are provided below, broken down by section.

Section 5: Watershed Evaluation and Best Management Practices

The ENCAC anticipated that the FEIR would contain significantly more detailed information on Best Management Practices (BMPs) than it does. In part, this is because there are no results available yet from the pilot program that evaluates the effectiveness of existing particle separators. The program requires a minimum of three seasons of monitoring, so final results will not be available for some time. The result, however, is that we have only general information about potential structural BMPs, and many of the locations are yet to be determined.

There is also still no information about the tracking mechanism for catch basin cleaning, nor any detailed data on the sediment removal rates from either catch basin cleaning or street sweeping. The databases for Boston, Brookline and the MDC have been "in development" for some time, and we expected they would be available for the FEIR. 15-2

The FEIR proposes no solution to the ongoing problems with maintenance, data collection and reporting on MDC's storm drains and catch basins. There is still no formal process to work with MHD on their BMPs. 15-3

While we assume the permits for this project from DEP and the Corps of Engineers will require commitments to the completion and maintenance of these BMPs, this is clearly an area where we believe the Muddy River Restoration Project Management and Maintenance Oversight Committee (MMOC) has a vital role. With so much still undecided and undeveloped with regard to BMPs, the regular participation of the MMOC is the best assurance that the BMPs will be implemented and the maintenance will in fact be done. 15-4

The MMOC will need detailed reporting about the ongoing pilot study, and should participate in the planning for the installation of the remaining structural and non-structural BMPs. The Proponents should make at least quarterly reports to the MMOC on the maintenance of all of their existing drains and catch basins that discharge to the Muddy River. This should begin immediately, as the Charlesgate dredging was allowed to go forward assuming BMPs were beginning to be implemented and maintenance was underway. 15-5
15-6

The MMOC should review annual capital and budget plans with Boston and Brookline to ensure that adequate funding will be made available to meet the BMP and maintenance commitments made in the FEIR. 15-7

Section 6: Management Structure and Maintenance Plan

The ENCAC spent a significant amount of time over the past year since the issuance of the April 2002 DROD discussing various models of maintenance/management structures and their implications for: 1) resolution of the results of years of deferred and poor park system maintenance; and 2) true involvement of citizens in a significant maintenance/management oversight role. 15-8

Integral to this work were ongoing conversations with the Proponents about their preferred management structure (a "public/private partnership") and our concerns that this structure would not adequately address project needs nor adequately guarantee protection of the investment.³ In the FEIR, the Proponents have erroneously stated that these conversations (between the ENCAC and Proponents) "did not result in a final recommendation." In fact, the ENCAC spoke at length with the proponents about their preferred management structure throughout the fall and at their request, delivered its proposed maintenance/management structure to the Proponents on December 23, 2002. A copy of the ENCAC's proposed management structure and accompanying diagram is found in Attachment A of this comment letter. Our proposal grew out of an earlier management structure model that was developed by the Proponents' own consultant, Clarissa Rowe. This is one in which a "cabinet" would accommodate the responsibilities of each existing project committee.⁴

15-8
cont.

The ENCAC suggests that either the Rowe cabinet structure or our own proposal would more likely create the appropriate mechanisms for informed discussion, inclusive decision-making and accountability in a true public/private partnership, all of which are needed and required to guarantee long-term meeting of performance standards and project success. This is because both models make room for the MMOC (Muddy River Restoration Project Maintenance and Management Oversight Committee) as a viable partner in decision-making and oversight. The Proponents' model does not. We would note also that their "Justification for Selection of Public/Private Partnership" (p. 6-12) does not fully explain their lack of responsiveness to the ENCAC's ongoing suggestions for opening up the maintenance/management structure to a broader range of citizens and private sector nonprofit organizations through inclusion of the MMOC in an active and meaningful role.

15-9

15-10

Maintenance and management are at the core of the project's long-term success and while the Proponents are promising the public better performance standards, the question is how will this be guaranteed? How do we effectively protect the enormous investment in dollars and time? The Commonwealth requires assurance that the investment be protected and that maintenance and management are adequately addressed. There must be a structure in place that will endure effectively for the long term. The structure proposed in Section 6 of the FEIR will not do this.

15-11

A model must allow for checks and balances, i.e. accountability to the citizenry of Massachusetts and the communities of Boston and Brookline by inclusion of an oversight committee in a maintenance and management structure.

MMOC: Muddy River Project Maintenance and Management Oversight Committee

In fall of 2002, dredging of the Charlesgate portion of the Emerald Necklace's Muddy River began as the first step of the overall restoration project. The Secretary's Draft

³ It is important to note that the Proponents' presentation of a draft management and maintenance structure to the ENCAC in late November 2002 revealed little if any change to an earlier model that the CAC had informed the Proponents was not acceptable.

⁴ Including the MMOC, the independent oversight committee required by the secretary in both DROD and FROD as well as the ENCAC and the technical assistance committee (TAC).

Record of Decision Phase One Waiver Finding 5, Condition f, calling for a new committee to meet the need for independent and public oversight of the future maintenance of the parks was one of the conditions of granting the Phase One Waiver to begin this work. In the FEIR, the oversight role of the MMOC is marginalized and therefore the Proponents are not in compliance with Section 5f of the DROD (EOEA #11865, April 16, 2002) in which the secretary required implementation of a management structure through "the creation of a permanent independent oversight body, representing the full range of stakeholders." This requirement and its more detailed iteration in the July 29, 2002 Final Record of Decision (FROD) is central to any acceptable and effective maintenance/management structure of the project. Although in a letter dated July 1, 2002 the Proponents committed to the establishment of such a committee, they have failed to demonstrate they are committed to true implementation of the MMOC.⁵ They have diminished the committee and its function in Section 6 of the FEIR. It should be noted in fact that the MMOC is referred to by another name throughout Section 6, as *the Environmental Improvements Committee (EIC)*.

No detail accompanies the statement in the FEIR (p. 6-9) that "the public/private partnership will work through the EIC to coordinate the maintenance and management efforts." The MMOC is not described as integral to the proposed maintenance/management structure nor is the MMOC included in regularly scheduled planning and policy meetings with staff at the Commissioner/Director level from the partnership (p. 6-11 "Meetings and Review Sessions"). In the Proponents' view, the MMOC is restricted to being the recipient of an "annual update report" (p. 6-11).

The ENCAC finds this unacceptable because:

1) The MMOC is required by the secretary through the Phase One Waiver.

Based on the Secretary's findings, the ENCAC believes that the role of the MMOC is to provide oversight and evaluation of the project in an ongoing way and therefore should have a central role in any maintenance and management structure proposed by the Proponents. Having representation at the management level will ensure the regular flow of information that is so critical to proper functioning of any oversight committee. Furthermore, we believe that the MMOC's participation in a maintenance/management structure is required by the secretary's description of the MMOC in the FROD:

"The independent oversight committee will participate in the development of performance standards and identify benchmarks to identify progress; provide independent review on a periodic basis to evaluate efforts to meet the project goals, including long-term maintenance and management goals; monitor and evaluate compliance with the provision of federal, state, and local permits and approvals (including Section 61 findings); and promote close coordination of activities among Boston and Brookline agencies, the MDC, and the MBTA. The owners of the resources (Boston, Brookline and the MDC)

⁵ The Muddy River Restoration Project Maintenance and Management Oversight Committee has been meeting monthly and sometimes bi-monthly since late October 2002. Its members include several ENCAC members and other private citizens and NGO's. A staff person has recently been hired to work closely with and for the committee. The chair of the MMOC has worked tirelessly to bring about a spirit of collaboration and cooperation among the voting members and its ex officio members who include representatives of the Proponents.

will of course continue to manage the resources under their control, with the flexibility they need to make day to day decisions and implement long term management and operational policies.

It should be noted that the Proponents have misinterpreted this last sentence to mean that the MMOC should not play a role in the planning and policy meetings "to be held several times a year" (FEIR p. 6-11). While the ENCAC agrees that day-to-day management is properly vested in the Proponents, this should be distinguished and apart from the MMOC's participation in planning and policy development and other project oversight tasks.

2) Citizen participation will ensure an open process and strengthen public support of the project. The MMOC should serve as the watchdog, the reporting mechanism and the protector of the public investment. At the same time it should serve as catalyst for optimal cooperation among the Proponents on planning, policy and prioritizing projects. Citizen involvement through the MMOC representation in the maintenance/management structure will help to ensure that performance standards are met, and also strengthen public support for the project in the form of increased advocacy in the long run. It is important that the Proponents receive valuable feedback and input at the planning and policy level. Park stewardship must be accountable to the public.

15-11
cont.

3) The value of a publicly accessible system of checks and balances for a project of this scope is inestimable. As a truly independent body, whose membership includes citizens and NGO's, the MMOC will help to build public support and ensure transparency in management practices and accountability - as required by the DROD and the FROD on this project. The MMOC's participation will ensure the direct flow of information, allowing equitable participation in planning and policy setting and serve as a mechanism for oversight and reporting so that a strengthened maintenance plan can be monitored evaluated and improved.

Memorandum of Agreement as part of the SEIR

The ENCAC recommends that the Proponents be required to prepare an SEIR that includes a Memorandum of Agreement (MOA) spelling out the maintenance and management obligations of the Proponents, and the role of the MMOC in the maintenance/management structure. The MMOC should be a signatory to the MOA along with the proponents, the MDC and the ENC. .

15-12

The Proponents recognize the importance of an agreement on management structure and maintenance responsibilities and the need to include the MDC in this agreement, FEIR (p. 6-19), yet they state that it will be negotiated "as part of the continuing work on the Muddy River project." The ENCAC believes that a strong, enforceable MOA is critical to the success of the project and is a requisite for complying with the Secretary's directive that "obtaining enforceable maintenance and management commitments is a necessary condition for the Final EIR to be found adequate." It should not be left up to the Proponents to develop after the fact, they must be directed to include their draft MOA in the SEIR. Because the project requires the financial commitment of the Commonwealth, Section 61 findings by the Executive Office of Environmental Affairs (EOEA) or the Department of Environmental Management (DEM) are required. Without a strong and satisfactory MOA, EOEA or

15-13

DEM will not be in a position to make a finding that damage to the environment has been avoided, minimized or mitigated to the greatest extent practicable.

To guide the Proponents and assist them, we recommend that you specify in your SEIR certificate the minimum provisions that must be included in the MOA. These include:

- Clear and binding commitment to improved stewardship, historic preservation and maintenance of parkland resources and best management practices (BMPs) by Boston, Brookline and the MDC;
- Inclusion of ENC director and MMOC chair as signatories;
- Duties, obligations and responsibilities of each signatory;
- Inclusion of MMOC and ENC representatives as participants in the top level management meetings;
- Schedule of top level management meetings to set priorities, establish policies, develop and implement programs and to review progress, with titles/positions of required MDC and municipal attendees;
- Clear and binding commitment to coordination and uniformity of parkland maintenance across jurisdictional boundaries;
- Development of performance standards for parkland maintenance with deadlines for adopting standards and an implementation schedule;
- Binding commitment to adequate staffing to implement performance standards and plan to close the projected gap between present and projected FTEs for adequate maintenance;
- Clear and binding commitment to operation and maintenance of BMPs, with specific schedules for maintenance of each entity's BMPs attached;
- Clear commitment to work cooperatively with the MMOC, share information with it, and to fund the MMOC Administrator adequately and in a timely manner each year
- Enforceable commitment by Brookline to fund and complete the restoration and reopening of the Carlton Street Footbridge;
- Mechanisms for dispute resolution; and
- Boston, Brookline and MDC reporting obligations to MMOC, EOEA Secretary, ENCAC, and Technical Advisory Committee.

15-13
Cont'd

Section 7: Historic Resources

The ENCAC believes the Proponents have not adequately addressed a number of issues with relation to the historic character of the park and the impact that this project will have on historic resources. "Historic Preservation" has been identified as one of the project goals. Therefore, the ENCAC hopes that Proponents will not forget the importance of the historic elements of the resource. The Proponents must acknowledge that the historic significance of the resource extends beyond individual elements to include historic vistas and the special character of the park. These must be protected throughout the project. A number of historic issues have not been significantly addressed by the Proponents. For example, not enough attention has been given to the Headwall at the Leverett Pond culvert or the islands which need stabilization. Additional issues are listed below.

15-14

Section 106 Compliance

The ENCAC is concerned that the project, without adequate attention to historic resource issues, will not meet the requirements of the Massachusetts Historic Commission in respect to addressing the potential adverse effects of the project. Any notice of a change to a historic resource, including the Carlton Street Footbridge, should require a Section 106 finding. 15/5

Trees

The FEIR indicates that 'heritage trees' will be protected, but it does not identify which trees are "heritage trees." The ENCAC believes that all trees in the project area that will remain after completion of the project should be properly protected, and that contractors should be responsible for providing protective fencing. Contractors should also be responsible financially for repairing or replacing any damaged trees as well as other elements of the park project that will impact the historic character of the parks. 15/6

Parkways

The ENCAC is concerned with plans for the future of the MDC parkways that may further divide the control of the resources of the historic parks. Any plan to shift control of the parkways to the state Highway Department should protect them as part of the overall historic resource. The Proponents and the MDC must ensure that roadways bordering the park are given the same care as the parkland itself. 15/6

Carlton Street Footbridge

The Carlton Street Footbridge remains a significant concern for members of the ENCAC. Section Six of the FEIR states:

- "The recommendations set forth in the document are intended to provide a framework for decision-making and to lay the groundwork for preserving, rehabilitating and restoring these features." and
- "Park users should be able to enjoy the parks without distraction, moving freely and with pleasure from city to town, path to bridge, woodland to overlook, experiencing the diversity of spaces Olmsted envisioned."

Despite this glowing rhetoric, Section Seven discusses removal and relocation options. These actions would be a complete contradiction to the stewardship intended by the Muddy River Project.

The Footbridge has been closed for more than two decades, and was specifically identified by the Mass. Historic Commission as a "character-defining feature." For over a year, Brookline has failed to contact the Massachusetts Historical Commission, as specified in the DEIR Certificate, and is still contemplating demolishing the primary designed entrance in Brookline to Riverway Park. The paradox is that the Proponents are simultaneously touting their intention to act as responsible stewards (the lack of which accounts in part for the current situation), and actively discussing whether they are bound by earlier agreements and proposing to spend money to hire consultants to help them figure out the cost of mitigation if they relocate or demolish, or make handicapped-accessible, the footbridge. Another possible clue to the

Proponents true intent is their failure to include funds for maintenance of the Footbridge in Table 6-10.

Will the citizens of Massachusetts be adequately protected against non-performance by the Proponents? We, the ENCAC, think not; and therefore ask that either of two options be considered: 1) require, as part of a SEIR that the Proponents clarify their legal obligations in performing their commitments, or 2) attach a significant financial incentive and/or sanction that will ensure the Proponents do not receive full state funding unless the Town of Brookline commits to the Footbridge restoration and maintenance obligations identified in Table 6-10 for the life of the Project. Without one of these actions, we consider the public investment at risk.

A history of the Carlton Street Footbridge issue and related background documents are supplied as Attachment C.

Section 10: Environmental Mitigation and Section 61 Findings

The mitigation measures outlined in this section are designed to protect the river, its fish and wildlife, the surrounding wetlands, and other areas affected by the project, including BMPs, traffic and noise. A project of this scope will have short-term impacts, potentially large ones, and the goal of this section is to specify what measures will be taken to ensure that those impacts are minimized.

There are measures related specifically to the short-term impacts of the dredging process, and others of larger scope such as erosion control, wetland resource management and maintenance. Of note, there are almost no mitigation plans for flood control during construction, which seems a significant oversight. An emergency storm response program should be developed and approved by DEP as well prior to any dredging activities.

The Independent Environmental Monitor (IEM) will have significant and important responsibilities on the project. A report from the IEM should be made to the ENCAC with the Proponents' annual report. The IEM must work closely with the MMOC to inform their oversight function.

One ongoing question is how effective the in-stream sedimentation basins will be. The FEIR shows little in the way of documentation about these basins. The only reference is to a concrete structure, quite different from what is proposed for this project, and the only data provided is qualitative. Clearly, if the project is to include these in-stream sedimentation basins, data should be collected on their effectiveness. The proposed data collection should be augmented by similar data collection at a nearby part of the river. There should also be data collected before and after a large rain event to see whether the basins actually hold the sediment they collect.

The issue of maintaining these basins is also poorly addressed in the FEIR. The Army Corps and the DEP will no doubt condition their permits on maintenance of these basins, and some funds are anticipated to be allocated in the Proponents' budgets on an annual basis. The ENCAC feels that maintenance of these basins will in fact be extremely difficult to implement, both because of the expense and the difficulty in

permitting. The MMOC will need to work closely with the Proponents to ensure that maintenance of these basins occurs. If they will not be maintained, they should not be constructed.

15.12
cut.

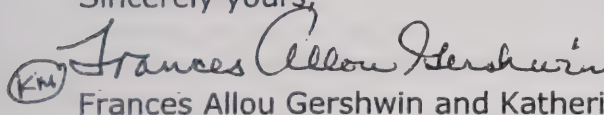
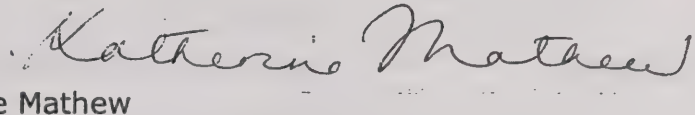
Finally, we ask that the plans submitted by the contractor for construction-related impacts be forwarded to the ENCAC and the MMOC.

15.23

Conclusion

While we want to reiterate our strong support for the overall project, the ENCAC continues to have concerns related to the protection of past and future investments in the park resource. We hope that you will address these concerns and ensure that this project is the first step in an ongoing partnership to protect and improve the Emerald Necklace.

Sincerely yours,

 
Frances Allou Gershwin and Katherine Mathew

On behalf of the Emerald Necklace Citizens Advisory Committee:

Kelly Brilliant, Fenway Alliance
Edward Burke, ROW
Isabella M. Callanan, Friends of the Muddy River
Suzanne Comtois, Fenway CDC
Edward Cutler, Ph.D.
Frances Allou Gershwin
Frances J. Kemp, Friends of the Muddy River
Arleyn Levee
Katherine Mathew, Boston GreenSpace Alliance
Arlene Mattison, Emerald Necklace Conservancy
Hugh Mattison, Friends of Leverett Pond
Tina Oddleifson, Brookline GreenSpace Alliance
George Proakis
Marion Sabal, Fenway Garden Society
Margaret Van Deusen, Charles River Watershed Association
Fredericka Veikley, Fenway Civic Association

encl.

Attachments

Attachment A:	ENCAC recommended maintenance/management structure	p. 1-4
Attachment B:	Additional Comments on Section 7 Historic Resources	p. 5-7
Attachment C1-C9:	Chronological documentation re. Section 7 Historic Resources Comments	p. 8-25

MEMO

TO: Muddy River Project Proponents
FROM: Emerald Necklace Citizens Advisory Committee
RE: Section 6 (Draft Management and Maintenance Plan, FEIR)
DATE: December 23, 2002

Management Structure

The Emerald Necklace CAC has reviewed 2 versions of possible management structures in preparation for the FEIR, neither of which have been found by the committee to meet the requirements of the Secretary set out in the FROD, the DROD and the Certificate on the DEIR. The CAC has engaged in thoughtful discussion to arrive at this conclusion – both among its own members and with the proponents. These discussions occurred over the past few months, most recently at the meeting of December 4, 2002 when the second management structure proposal was presented. We have elected at this time to present to you in writing our own recommendation for a management structure, with the understanding that in the long term, other options such as the Joint Powers Act should continue to be evaluated.

In 6.1, Introduction, we propose a management structure that "takes the form of a Project Management Council." This council would be made up of one representative from each of the following: Boston Parks and Recreation Dept., Brookline Parks and Open Space, MDC, EOEA, Emerald Necklace Conservancy, the project Technical Advisory Committee (TAC), and the Muddy River Restoration Project Management and Maintenance Oversight Committee (MMOC). It would meet at least quarterly and as need arises, to be determined by the Council members. The Council would "set policy and goals for work inside the project area, parkland (park maintenance) and for work outside the parkland (principally BMPs)" (Draft Section 6, Management and Maintenance Plan, p. 6-4).

The decisions of the Council would guide implementation, through the "Implementation Team" described by the proponents. Funding for the project would be managed by the US Army Corps of Engineers, EOEA, Boston, Brookline, and the Emerald Necklace Conservancy. Oversight of the project will be by the MMOC, as well as the regulatory agencies who issue project permits including EOEA and the COE. A diagram of this proposed structure is attached.

To further clarify the project management structure, we also attach an outline of roles and responsibilities of the various groups involved in the project.

We look forward to reviewing the FEIR, and will meet again on January 15, 2003, to begin preparing our comments to the Secretary. Thank you for your work with the committee, and on the project, and we wish you a happy holiday season.

Muddy River Restoration Project Structure

Summary of Roles and Responsibilities of Project Partners

Boston/Brookline

- Partial park owners
- Proponents on project
- Financial contribution to project primarily (though not exclusively) in maintenance
- Responsible for maintenance of parklands as set out in maintenance plans, storm water system and BMPs
- Fund and manage crews
- Signatory to MOUs/MOAs for project, including park management and maintenance, and project funding.

MDC

- Partial park owners
- Permit holder for some parts of project
- No current financial contribution to project other than agreement to future maintenance
- Jointly responsible with contractor for maintenance of parklands during Charlesgate contract, and wholly responsible after contract once Charlesgate is complete
- Undetermined responsibility for drainage system and roadway systems in park
- Signatory to MOUs/MOAs for project, including park management and maintenance and its funding for the property under its control

Massachusetts Executive Office of Environmental Affairs

- Permitting and guidance on project
- Significant financial support of project through bond bill
- Signatory to MOUs/MOAs for project, including park management and maintenance
- Liason with Office of Administration and Finance
- Guide implementation of an Emerald Necklace geographic information system and act as custodian for associated layers and data

US Army Corps of Engineers

- Permitting, contracting and final design of project
- Significant financial support of project through habitat restoration and flood funds
- Signatory to MOUs/MOAs for project

Technical Advisory Committee

- Technical input to project design, permitting and implementation

Summary of Roles (cont.)

Emerald Necklace Conservancy

Restoration, maintenance, advocacy, public education and constituency building for Emerald Necklace

Private sector input to and support for Muddy River Project (financial partnering, advocacy, management of volunteer crews)

Public/Private partnership building in Emerald Necklace

Work with Boston/Brookline/MDC to implement EN Master Plan

Management of discreet projects in the park (eg. Rose garden project)

Review of maintenance of the parklands throughout the Emerald Necklace

Forum to discuss issues in the Emerald Necklace

Review of budgets and contracts in the Emerald Necklace

Management and Maintenance Oversight Committee

Independent monitoring and review of Muddy River Restoration Project including:

- maintenance of parklands in Muddy River parks
- maintenance of storm water conveyance systems and BMPs
- compliance with permits, MOUs/MOAs, and other agreements

Financial accountability through review of project budgets and contracts

Forum to discuss project decisions

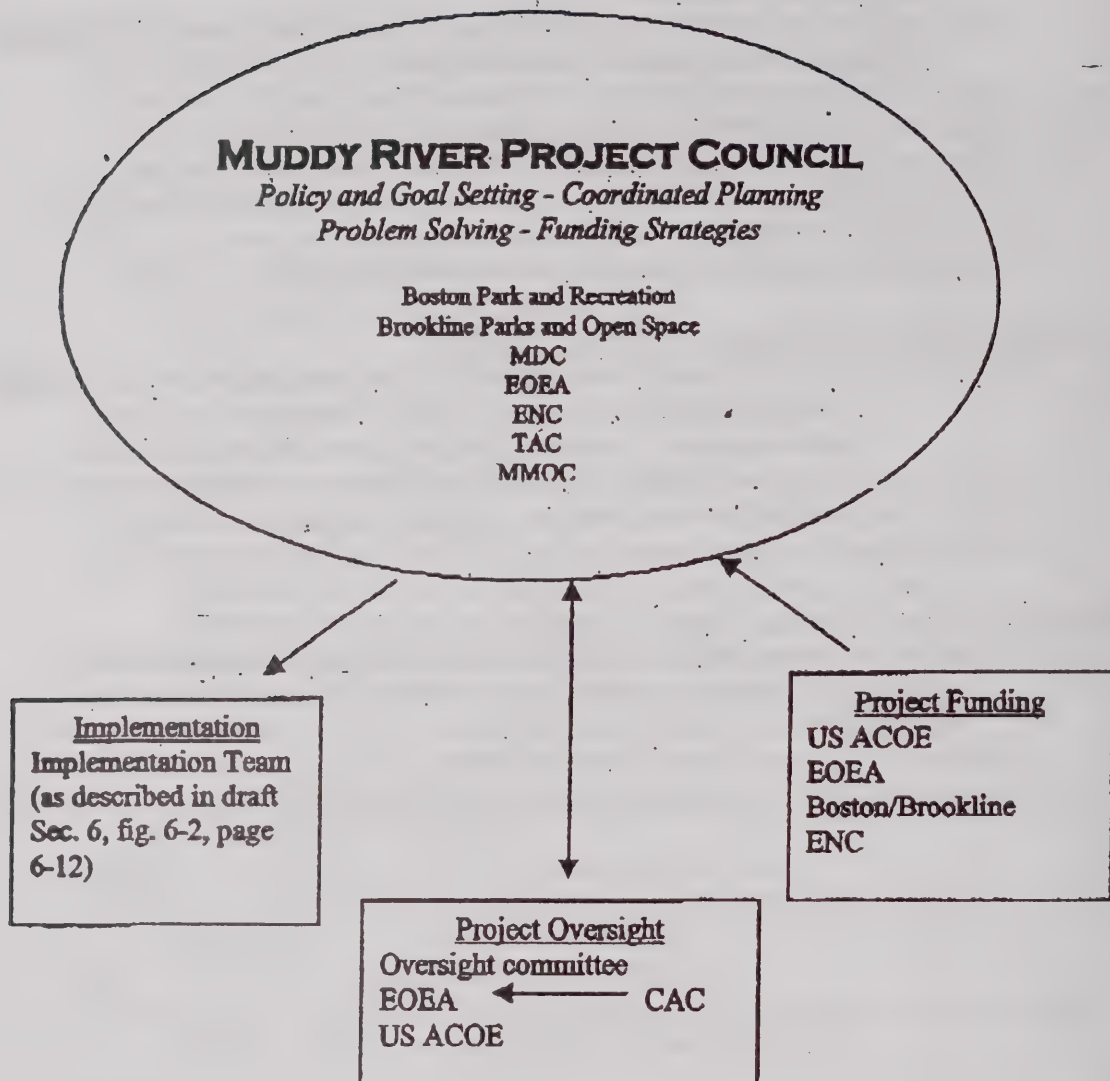
Emerald Necklace Citizens Advisory Committee

Advise the Secretary through MEPA program on projects undertaken in the Emerald Necklace, including but not limited to Phase I, Muddy River Restoration

Comment to proponents throughout permitting process on project design

Report annually to Secretary on Phase I, Muddy River Restoration

Phase I Muddy River Restoration Project Management Flowchart



- Council directs implementation based on Project goals, permits and funds
- Oversight bodies review implementation and management; inform council
- Funding partners establish project funds

*Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement,
and Historic Preservation Project (EOEA #11865)*

Attachment B
Comments on FEIR Section 7: Historic Resources

Background:

The Carlton Street Footbridge, which crosses the MBTA tracks near Longwood Station, is part of the Emerald Necklace Master Plan, and appears on an 1890 Olmsted Plan for the Riverway. It was named as one of Massachusetts' ten most endangered historic resources in November 2002 by Preservation Massachusetts; its historic status is not in doubt.

A series of reports commissioned in 2000 by Brookline unanimously state that restoration is feasible.

Events of 2002:

The DEIR Certificate (p. 13) issued by EOEA in April 2002 made the following statement regarding the restoration of the Carlton Street Footbridge:

"After review of the record, including the Master Plan and supporting materials, and the opinion of MHC, I find that the Carlton Street Footbridge is historically significant and is an integral component of the Olmsted Park System, and its eventual rehabilitation and reopening is an established part of the wider Emerald Necklace rehabilitation effort. This Certificate assumes that the Town of Brookline will act in good faith to expeditiously implement the elements of the Master Plan within its control, including the rehabilitation and reopening of the Carlton Street Footbridge."

Supporters of restoration submitted a warrant article for consideration by the Spring 2002 Town Meeting asking for funding for plans and specifications for reconstruction. The Board of Selectmen amended this to a resolution asking that "various analyses be prepared to permit a final resolution" and asked that the Board of Selectmen "provide an article in the FY04 Warrant requesting \$30,000 in the FY04 Capital Improvement Program (CIP) for the cost of preliminary plans for and other preliminary costs associated with reconstruction, relocation, and removal". (See Attachment C-1). At the Town Meeting, both speakers for the Board of Selectmen and for the Advisory Committee argued for the resolution so that the Town's Engineering Department could determine costs more accurately for three alternatives presented for the future of the Bridge and possible mitigation costs associated with each option. This resolution was passed by Town Meeting.

On August 20, 2002 the ENCAC requested from the Proponents the "proposed schedule and funding sources for bridge rehabilitation". (See Attachment C-2). In September the Emerald Necklace Citizens Advisory Committee (ENCAC) received a response from Mr. A. Thomas DeMaio, Brookline Commissioner of Public Works stating "the Selectmen were lastly requested by Town Meeting to provide an article in the FY04 Warrant that would appropriate an initial sum for preliminary plans pursuant to an accepted option" and that the Brookline Engineering Division "has programmed these cost evaluations in their upcoming Fall/Winter project schedule." (See Attachment C-3) *[These cost evaluations were completed and presented to the Board of Selectmen in April 2003 – see below.]*

Events of 2003:

The FEIR reiterates the DEIR provisos in Section 7.3.2:

- Consult with the Massachusetts Historical Commission (MHC) on methods of avoiding, minimizing, or mitigating impacts. Also consult with MHC regarding alternatives under consideration for the Carlton Street Footbridge.

*Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement,
and Historic Preservation Project (EOEA #11865)*

Attachment B
Comments on FEIR Section 7: Historic Resources

- The Carlton Street Footbridge is historically significant. Brookline must act in good faith to expeditiously implement the elements of the Master Plan within its control, including the rehabilitation and reopening of the footbridge.
- Any change in Brookline's commitment to rehabilitate and reopen the footbridge will require, at a minimum, the filing of a Notice of Project Change.

In February 2003, the ENCAC sent a letter to Deborah Goldberg, Chairman of the Board of Selectmen asking for 1) a copy of your "comprehensive and succinct analysis" to date 2) the final text, or at least a substantially complete draft, of any warrant article(s) proposed relating to the restoration, and 3) for results of any research you have completed with the Massachusetts Historical Commission." (Attachment C-4)

Ms. Goldberg's response was "We anticipate that the consultant services which might be necessary for mitigation analysis can be purchased through the proposed \$30,000 appropriation, if approved. According to the Town's Director of Engineering, these services could be secured in the summer months after Town Meeting acts in May." (See Attachment C-5).

The FY04 CIP includes \$30,000 for "plans", \$90,000 as the Town's share for funding "an accepted option" (demolition, relocation, or restoration), and \$510,000 to be funded from state, federal and outside funds.

In March 2003 supporters of restoration submitted two warrant articles for debate at the Spring 2003 Town Meeting. Article 13 is a resolution which lists a series of commitments that Brookline has made relating to implementing the Emerald Necklace Master Plan, starting in 1986 and including the 1999 Memorandum of Understanding signed with the Commonwealth "to cooperate relative to the Project to ensure the preservation and protection of this unique Olmsted park system" and asks "That it is the will of Town Meeting, and the Selectmen are directed to act accordingly, to fulfill the commitments made by the Town between 1986 and 2003 to the Commonwealth by taking the steps necessary to restore expeditiously the Carlton Street Footbridge entry to Riverway Park, including the preparation and submission of applications for outside funds to restore the bridge and providing funding from grants, aid, loans, tax revenue, or any other source, as necessary to restore the Footbridge." (See Attachment C-6)

Article 12 seeks \$30,000 for plans and specifications "for the reconstruction and restoration of the Carlton Street Footbridge entrance to Riverway Park". If passed, relocation and demolition options would be eliminated. (See Attachment C-7)

The analysis of the different options (demolition, relocation, or restoration), exclusive of possible mitigation costs, was completed by the Brookline Engineering Division and submitted to the Brookline Board of Selectmen on April 8, 2003. (See Attachment C-8) Results are summarized below:

	Gross Cost	Potential Grants	Net Cost to Town
Demolition	\$123,000 - \$141,000	--	\$123,000 - \$141,000
Rehabilitation without			
ADA Ramps	\$600,900*	\$540,810	\$ 60,900
ADA Ramps	\$140,400*	\$126,360	\$ 14,040
Relocation	\$943,475	--	\$943,475

*Eligible for TEA-21 funding of up to 90%, which would reduce the Town's share to \$74,940

Also on April 8, 2003 the Board of Selectmen held a public hearing on Article 13, the Resolution asking that Brookline keep its commitments to implementation of the Emerald Necklace Master

*Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement,
and Historic Preservation Project (EOEA #11865)*

***Attachment B
Comments on FEIR Section 7: Historic Resources***

Plan, in accordance with long-standing agreements. Photostats from some of these agreements— (See Attachment C-9) were presented. Chairman Goldberg asked the Town Counsel, David Turner, to review these agreements to determine if they were binding stating that the intent of these agreements were not “clear” to her.

What is “clear” to the ENCAC from this debate is that there can be no assurance that Brookline, or Boston for that matter, will adhere to signed agreements. The Footbridge is the most glaring example of neglect of a historic resource in the Project area, and is symbolic of deferred maintenance in the entire Emerald Necklace.

ARTICLES 24 and 25

SELECTMEN'S SUPPLEMENTARY REPORT AND RECOMMENDATION

The Selectmen unanimously (5-0) approved the amendment offered by the Advisory Sub-Committee regarding the Carlton Street Footbridge resolution. The proposed amendment adds the words "in the FY04 CIP" in the first "Now Therefore, Be It Resolved" clause, as highlighted below.

**RESOLUTION
CARLTON STREET FOOTBRIDGE**

WHEREAS, the future status of the Carlton Street Footbridge has been under active review by various Town departments, committees, and consultants for four years; and

WHEREAS, more than \$62,000 has already been expended on feasibility studies since FY98; and

WHEREAS, the funding plan for whatever future action is taken on the Footbridge should be consistent with the Town's established schedule of the Capital Improvements Plan; and

WHEREAS, for the well being of the immediate neighborhood, the community at large and all other interested parties, various analyses should be prepared to permit a final resolution regarding the Carlton Street Footbridge to be adopted at a future Town Meeting.

NOW THEREFORE, BE IT RESOLVED:

That the Selectmen are requested to provide an article in a FY04 Warrant that requests that \$30,000 be appropriated in the FY04 CIP for the cost of preliminary plans for and other preliminary costs associated with the reconstruction, relocation and removal of the Carlton Street Footbridge, inclusive of mitigation, with provision, in the event of either reconstruction or relocation, for full ADA compliance; and

That the Selectmen are authorized to apply for grants, gifts, aid and reimbursements from federal, state and private sources and agencies for such purposes, provided that no Town funds in excess of those specifically authorized above shall be expended or committed without authorization at a future Town Meeting; and

That this Town Meeting's determination is that the Town's funding share is not to exceed the greater of \$100,000 or 13% of the total cost for all project phases subsequent to preliminary plans and other preliminary costs authorized above, including, but not limited to, final design, engineering, construction, relocation, or removal, and mitigation.

ADVISORY COMMITTEE'S SUPPLEMENTARY REPORT AND
RECOMMENDATION

The full Advisory Committee has not had an opportunity to consider this amendment. There will be an Advisory Committee recommendation on this amendment in time for debate on this resolution.

August 20, 2002

Ms. Justine Liff, Commissioner
Boston Parks and Recreation Department
1010 Massachusetts Avenue
Boston, MA 02118

Mr. A. Thomas DeMaio, Commissioner,
Brookline Department of Public Works
Town Hall, 333 Washington St.
Brookline, MA 02445

Re: Emerald Necklace Environmental Improvements Master Plan and Phase I Muddy River Flood Control, Water Quality, Habitat Enhancement and Historic Preservation Project, EOEA No. 11865

Dear Commissioner Liff and Commissioner DeMaio:

The Emerald Necklace Citizens Advisory Committee (ENCAC) is working with Boston and Brookline, as the Proponents of the Emerald Necklace Environmental Improvements Master Plan, to complete its review of the Final Environmental Improvements Report Phase I (FEIR) by December 1, 2002. The ENCAC has asked the Proponents to complete their draft sections of the FEIR by mid-November so that the ENCAC can review these and provide comments to Secretary Durand in a timely manner.

There are a number of outstanding issues specified in the Draft Environmental Impact Report dated April 16, 2002 (DEIR) that require further analysis and/or clarification. We would like to establish a continuing dialog as to the progress being made on these issues, many of which are complex and will require significant effort and commitment to complete by mid-November.

One issue of concern is the schedule for the restoration of the Carlton Street Footbridge, the primary designed Brookline entrance to Riverway Park. To quote the section on the Carlton Street Footbridge in the DEIR (page 13), "This Certificate assumes that the Town of Brookline will act in good faith to expeditiously implement the elements of the Master Plan within its control, including the rehabilitation and reopening of the Carlton Street Footbridge."

To accomplish expeditious rehabilitation, decisions may require action by the Fall Brookline Town Meeting which convenes on November 12. As suggested by the DEIR, there may also need to be discussion with the Massachusetts Historic Commission on bridge rehabilitation.

The ENCAC requests that you inform us of the proposed schedule and funding sources for bridge rehabilitation by our next meeting, which will be held during the week of September 9, 2002.

Thank you for your attention.

On behalf of The Emerald Necklace Citizens Advisory Committee:

Ed Burke, ROW Coalition	Tina Oddleifson, Brookline Greenspace Alliance
Edward Cutler, PhD, Brookline Resident	George Proakis, Boston Resident
Arlene Mattison, Emerald Necklace Conservancy	Fredericka Veikley, Fenway Civic Association
Kay Mathew, Boston Greenspace Alliance	Margaret VanDeusen, Charles River Watershed Association
Hugh Mattison, Friends of Leverett Pond	

copy to:

Hon. Thomas Menino, Mayor, City of Boston	Robert Durand, Secretary, Executive Office of Environmental Affairs
Chairman Deborah Goldberg, Board of Selectmen, Town of Brookline	Arthur Pugsley, IV, Executive Office of Environmental Affairs
Rich Kelliher, Town Administrator, Brookline	Emerald Necklace Citizens Advisory Committee
Bruce Conklin, Camp, Dresser & McKee	



TOWN OF BROOKLINE
Massachusetts
DEPARTMENT OF PUBLIC WORKS

September 6, 2002

A. Thomas DeMaio
Commissioner

Emerald Necklace Citizens Advisory Committee (ENCAC)
C/O Loraine M. Della Porta, Facilitator
Massachusetts Office of Dispute Resolution
One Ashburton Place, Room 501
Boston, MA 02108

RE: **CARLTON STREET FOOTBRIDGE**
Status and Town Meeting Resolution

Dear Members:

I am in receipt of your letter of August 20, 2002, in which ENCAC members requested current information on the proposed schedule and funding sources for the Carlton Street Footbridge, in the context of references made to this structure in the Draft Environmental Impact Report for Phase I of the Emerald Necklace Environmental Improvements Master Plan.

As many of your membership will recall, the Carlton Street Footbridge was the subject of two Warrant Articles, one proposing removal and the other rehabilitation, submitted to this past Brookline Spring Town Meeting. At that time and in response to these opposing Articles, the Town's Board of Selectmen proposed a Resolution that was adopted by simple majority vote after formal debate.

Immediate direction on the issue of the Carlton Street Footbridge is contained in this Town Meeting Resolution, as well as subsequent parameters. In summary, due to the growing emphasis on mitigation and accessibility associated with each of the footbridge options, Town Meeting requested that further cost and feasibility analyses be prepared for reconstruction, relocation and removal in order to permit a final resolution regarding the bridge structure. Based on this anticipated study, the Selectmen were lastly requested by Town Meeting to provide an article in a FY'04 Warrant that would appropriate an initial sum for preliminary plans pursuant to an accepted option.

The Department of Public Works is bound by this Spring Town Meeting Resolution, and is, in fact, the key vehicle in the process outlined above. Specifically, the Engineering Division was directed to examine the identified cost factors and present succinct and comprehensive analyses in preparation for the 2003 Spring Town Meeting, at which FY'04 Warrant Articles will be submitted, including that which was requested of the Selectmen on the topic of the footbridge.

At this time, the Town's Engineering Division has programmed these cost evaluations in their upcoming Fall/Winter project schedule. Peter Ditto, the Division's Director, is available at (617) 730-2138 should Members have further questions.

Sincerely,

A. Thomas DeMaio
Commissioner

CC: Board of Selectmen, Brookline
Robert Durand, EOE
Margaret Dyson, Boston Parks and Recreation Dept.

333 Washington Street • Brookline, Massachusetts 02445-6863
Telephone: (617) 730-2156 Facsimile: (617) 730-2258
<http://www.townofbrooklinemass.com>

Emerald Necklace Citizens Advisory Committee

Preserving the Olmsted Legacy



Charles Birnbaum

Dudley Bonsal

Kate Bowditch

Kelly Brillon

Ed Burke

Isabella Callahan

Suzanne Carrois

Christine Cooper

Ed Cutler

Frank Gershwin

Alan Goodman

George Hagerty

James Igoe

Frances Kemp

John Leahy

Ariene Levee

Katherine Mathew

Ariene Mattison

Hugh Mattison

Lauren Meier

John Odeh

George Proakis

Marian Sabal

Fredericka Veikley

February 21, 2003

Ms. Deborah Goldberg, Chairman
Brookline Board of Selectmen
Town Hall, 333 Washington St.
Brookline, MA 02445

Re: Carlton Street Footbridge

Dear Ms. Goldberg:

The Emerald Necklace Citizens Advisory Committee is currently reviewing the FEIR for the Muddy River Project.

The Historic Resources Section, Section 7.3.3, page 7-3, makes the following statement:

"The Engineering Division was further directed to examine the identified cost factors and present the results of the analyses in preparation for the 2003 Spring Town Meeting. Based on these results, the Selectmen will provide an article in the FY'04 Warrant that will appropriate an initial sum for preliminary plans to carry out the option selected at Town Meeting. A total of \$600,000 has been allocated in the Town's Capital Improvement Plan for this purpose. It is anticipated that the Engineering Division **will conduct the cost evaluations in their 2002-2003 fall/winter schedule.**"

Mr. A. Thomas DeMaio, Commissioner of Public Works, sent our committee a letter dated September 6, 2002, reporting the status of the Carlton Street Footbridge, which states:

"Based on this anticipated study, the Selectmen were lastly requested by Town Meeting to provide an article in a FY '04 Warrant that would appropriate an initial sum for preliminary plans pursuant to an accepted option. The Department of Public Works is bound by this Spring Town Meeting Resolution, and is, in fact, the key vehicle in the process outlined above.

Specifically, the Engineering Division was directed to examine the identified cost factors and present succinct and comprehensive analyses in preparation for the 2003 Spring Town Meeting, at which FY '04 Warrant Articles will be submitted, including that which was requested of the Selectmen on the topic of the footbridge."

As we understand it, that analysis was to have been done during the "fall/winter schedule". Winter will soon be over, and "preparation for the 2003 Spring Town Meeting" starts with submission of warrant articles between February 13 and March 13. If the Town is to submit an article for \$30,000 "for preliminary plans to carry out the option selected", how will this option be determined at Town Meeting without the completion of the "succinct and comprehensive analyses" mentioned above before Town Meeting convenes?

We are concerned that there seems to be a likelihood of further delay in restoration, which would conflict with the proviso in the DEIR Certificate dated April 16, 2002, which states:

"This Certificate assumes that the Town of Brookline will act in good faith to expeditiously implement the elements of the Master Plan within its control, including the rehabilitation and reopening of the Carlton Street Footbridge."

Brookline as one of the Proponents of the Muddy River Project, itself states on page 6-40 of their FEIR:

"The Master Plan for the Emerald Necklace Parks.....provides an invaluable resource for the stewards of the Emerald Necklace. The recommendations set forth in the document are **intended to provide a framework for decision-making** and to lay the groundwork for preserving, rehabilitating, and restoring these features." (character-defining features including circulation systems and site entries, and furnishings and structures)

The CAC believes that satisfying the Secretary's proviso regarding "expeditious" implementation would be advanced by a timely comprehensive and succinct analysis completed *before* Brookline spring Town Meeting.

In order for the CAC to comment fairly on the FEIR and related intentions of the Proponents we request that you

- 1) send a copy of your "comprehensive and succinct analysis" to date
- 2) provide the final text, or at least a substantially complete draft, of any warrant article(s) proposed relating to the restoration
- 3) provide results of any research you have completed with the Massachusetts Historical Commission.

Since time is an important element, please send what is available before the end of February to:

Loraine M. Della Porta, Esq.
Deputy Director
Massachusetts Office of Dispute Resolution
One Ashburton Place, Room 501
Boston, MA 02108
email: loraine.dellaporta@state.ma.us

Truly yours,

Hugh Matthews

E. B. Cutler

Christine O'Sullivan

Katherine Matheson

Margaret Van Buren

Francis Allan Beeshaw
Edward J. Bond
Arlene Matheson

copy to: Ellen Roy Hertzfelder, Secretary, EOE
Richard Kelleher, Town Administrator, Brookline
A. Thomas DeMaio, DPW Commissioner, Town of Brookline
Margaret Dyson, Boston Parks and Recreation Department
Arthur Pugsley, MEPA Analyst, EOE



TOWN of BROOKLINE

Massachusetts

BOARD OF SELECTMEN

DEBORAH B. GOLDBERG, CHAIRMAN

DONNA R. KALIKOW

JOSEPH T. BELLER

GILBERT R. NOY, JR.

ROBERT L. ALLEN, JR.

RICHARD J. KELLNER
Town Administrator

March 4, 2003

333 WASHINGTON STREET
BROOKLINE, MASSACHUSETTS 02445
TEL: (617) 730-2200
FAX: (617) 730-2054
www.townofbrookline.ma.us

To: Members of the Emerald Necklace Citizens
Advisory Committee:

Thank you for your letter of February 21, 2003 concerning upcoming budgetary actions regarding the Carlton Street Footbridge. The Town has been acting in accordance with the Town Meeting Resolution adopted in May, 2002. (Attached)

The Capital Improvements Program submitted by the Town Administrator on February 15, 2003 includes two recommended appropriations for the Footbridge which would be considered at the upcoming Annual Town Meeting. One is for \$30,000 to support continued work by the Engineering Division. The other is for \$90,000, which represents either 15% of the Town's share of a \$600,000 restoration/relocation project or the totality of costs for demolition.

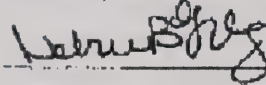
The approach outlined above represents a good faith effort to conform with the Resolution. Until Town Meeting makes a final determination on the ultimate disposition of the bridge, there is little choice but to prepare for the range outcomes that have been suggested by the Town Meeting Resolution.

We anticipate that the consultant services which might be necessary for mitigation analysis can be purchased through the proposed \$30,000 appropriation, if approved. According to the Town's Director of Engineering, these services could be secured in the summer months after Town Meeting acts in May. This would help inform a future Town Meeting decision concerning the final scope of work to be developed for the footbridge.

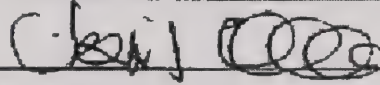
As this Board believes it has a good faith obligation to Town Meeting to include \$30,000 in the budget, we feel similarly obligated to respect the other provisions of the Resolution. In this regard, the stipulation that "no funds in excess of those specifically authorized (\$30,000) shall be expended or committed without authorization at a future Town Meeting" has also been observed. However, we believe that the approach outlined for the upcoming appropriations can support timely action by the Engineering Division to advance the necessary planning for the potential range of outcomes.

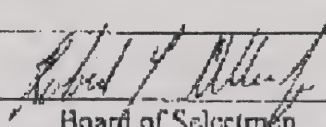
The warrant article(s) and related documents will be made available as they emerge during the course of Board and Advisory Committee preparations for the Combined Reports. As these materials are developed, they will be made available to everyone who is interested.

Sincerely,



Donna R. Kalikow





Board of Selectmen

Cc: Richard J. Kelliher, Town Administrator
A Thomas DeMaio, Commissioner of Public Works
Lorraine Dellaporta
David Turner, Town Counsel

Carlton Street Footbridge - RESOLUTION

ARTICLE _

To see if the Town will adopt the following resolution:

WHEREAS, the future status of the Carlton Street Footbridge entry to the Riverway Park has been under active review by various Town departments, committees, and consultants for four years;

WHEREAS, the Town has conducted studies totaling in excess of \$73,000 since FY98 that have found that the bridge is structurally sound and feasible to restore, that the bridge is an integral element of the Riverway Park and therefore enjoys designation on the State and National Registers of Historic Places, and that its restoration would meet the eligibility requirements of state and federal grants that are likely to make the cost to the Town of restoration less than that of demolition;

WHEREAS, funding for restoration was first scheduled in the FY2001 Capital Improvement Program for FY2003;

WHEREAS, the Dukakis administration implemented a statewide Olmsted Historic Landscape Historic Preservation Program and an Emerald Necklace Master Plan was begun in 1986. The Plan, which includes the Carlton Street Footbridge as a restoration element, was approved unanimously in 1991 by the Board of Selectmen after a process that included public comment, and presentations to the Conservation Commission, Preservation Commission, Park and Recreation Commission, and Planning Board. The Plan, updated in 2001, states

"The Master Plan has been formally adopted by both Brookline and Boston and has been the basis for all permitting and funding of park improvements implemented since 1989";

WHEREAS, in 1986 the Town executed a Grant Agreement between the Commonwealth and Town of Brookline for the Olmsted Historic Preservation Program stating

"The City [Town] will agree to formally accept the Master Plan as the framework for all future park-related construction. Future funding for additional capital improvements by the Commonwealth will be contingent upon the City's [Town's] adherence to the Master Plan";

WHEREAS, in 1999 the Environmental Notification Form Certificate for the Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project states

"The purpose of this project is to ensure the continued restoration of Olmsted's Emerald Necklace in its entirety";

WHEREAS, in 1999 the Town executed a Memorandum of Understanding with the Executive Office of Environmental Affairs signed by the Chair of the Board of Selectmen agreeing

"to cooperate relative to the Project to ensure the preservation and protection of this unique Olmsted park system";

WHEREAS, in 2002 the Draft Environmental Impact Report (DEIR) Certificate issued by the Secretary of Environmental Affairs regarding the Carlton Street Footbridge states

"In recognition of the historic value of the bridge, MHC [Massachusetts Historical Commission] has determined that the demolition of the bridge would constitute an 'adverse effect' on the State and National Register Olmsted Park System"

and further states

Carlton Street Footbridge - RESOLUTION

"This Certificate assumes that the Town of Brookline will act in good faith to expeditiously implement the elements of the Master Plan within its control, including the rehabilitation and reopening of the Carlton Street Footbridge."

WHEREAS, in 2003 the Final Environmental Impact Report (FEIR) for the Muddy River Project prepared and submitted jointly by Boston and Brookline makes the following statements:

"Proponents [Boston and Brookline] will be required to maintain the historic and character defining features of the restored parks."

"The historic and character defining features include what the National Park Service guidelines call the character defining features, which under the National Park Service (NPS) guidelines would include:

- Spatial relationships;*
- Views and vistas;*
- Topography;*
- Circulation systems and site entries;*
- Vegetation;*
- Water features; and*
- Furnishings and structures."*

"The recommendations set forth in the document [The Master Plan for the Emerald Necklace Parks] are intended to provide a framework for decision-making and to lay the groundwork for preserving, rehabilitating and restoring these features."

"The work proposed in the EIR will provide historical restoration, rehabilitation or preservation of the existing character defining features."

"Scheduling of rehabilitation or repair work for each of these historic features should be included in the annual budget as an estimated contingency item."

WHEREAS, restoring and reopening the footbridge entrance to Riverway Park will implement a significant element of the Master Plan, and in conformity with the Town's 2003 commitment as a co-proponent of the Muddy River restoration, will restore a structure that is an historic and character defining element of the views and vistas, circulation system and site entry of the Emerald Necklace Parks; and

WHEREAS, it is in the interest of the Town to fulfill its commitments to the Commonwealth in order to continue Brookline's credibility and to avoid jeopardizing future funding;

NOW THEREFORE, BE IT RESOLVED:

That it is the will of Town Meeting, and the Selectmen are directed to act accordingly, to fulfill the commitments made by the Town between 1986 and 2003 to the Commonwealth by taking the steps necessary to restore expeditiously the Carlton Street Footbridge entry to Riverway Park, including the preparation and submission of applications for outside funds to restore the bridge and providing funding from grants, aid, loans, tax revenue, or any other source, as necessary to restore the Footbridge.

Explanation

In 1984, the Dukakis administration implemented a statewide Olmsted Historic Landscape Historic Preservation Program. A number of parks in Massachusetts designed by noted landscape architect Frederick Law Olmsted were designated for restoration. The Emerald Necklace, which extends from the Charles River to Franklin Park, was one of these.

Carlton Street Footbridge - RESOLUTION

The first phase was to develop a Master Plan, which was begun in 1986. That year, in a contract with the Massachusetts Executive Office of Environmental Affairs (EOEA), the Town agreed that future state funding for the entire project would be contingent upon Brookline's adherence to a Master Plan. In 1988, eleven Brookline citizens, as well as a representative from each of four commissions, (Conservation Commission, Preservation Commission, Park and Recreation Commission, and Planning Board), were appointed by the Board of Selectmen to serve on the Olmsted/Riverway Restoration Project Municipal – Advisory Committee. After over two years of public meetings by the full committee, including two broadly advertised hearings, the Brookline portion of the Plan was complete.

In April 1991, the Plan was presented to and approved by the four Boards and Commissions. An advance copy of the Plan was distributed to each Selectman, and then presented publicly at a hearing before the Board of Selectmen. Because the Master Plan was detailed and comprehensive, a 20-minute videotape was created and shown to both the Boards and Commissions and to the Board of Selectmen to illustrate each detailed recommendation. This video was also aired on Brookline Access Television. The Board of Selectmen unanimously voted approval of the document in its entirety, with one Selectman making the statement that "I think it's an absolutely terrific job, and I intend to support it in its entirety."

The Carlton Street Footbridge is specifically included in the Master Plan as the designed entrance to Riverway Park, and appeared on the videotape as an important restoration element.

Restoration of Olmsted Park in the Pill Hill neighborhood has followed the Master Plan closely. Some neighbors initially expressed concern about the potential for increased traffic, illegal parking and crime if the existing barriers between Boston and Brookline were removed. However, The result has been the restoration of a park once derelict and shunned, now vibrant, attractive and safe.

Over the same period, Riverway Park has received little attention and the Carlton Street entrance has been closed for years as a symbol of this neglect. The bridge's disrepair was the reason the Town closed the entrance in the mid-1970's.

Today, the Master Plan remains a document worthy of implementation. The official documents quoted in this Resolution are based on the Town's acceptance of, and anticipated implementation of, the Master Plan.

This Resolution asks Town Meeting to honor the numerous current agreements and commitments based on the Master Plan and made by the Town with the Commonwealth on behalf of Brookline citizens.

The Town has stated in the Final Environmental Impact Report for The Muddy River Project, submitted this year in February and now being reviewed by EOEA, that "The recommendations set forth in the document [The Master Plan for the Emerald Necklace Parks] are intended to provide a framework for decision-making and to lay the groundwork for preserving, rehabilitating and restoring these features."

We merely ask that Brookline be true to its words and keep its commitments. The most immediate outstanding commitment to historic preservation is the conclusion of the discussion of removal or relocation of the Carlton Street entrance to Riverway Park and the expeditious restoration of the Carlton Street Footbridge.

PETITION ARTICLE

To see if the Town will appropriate and transfer from available funds \$30,000, or any other sum, to be expended under the direction of the Board of Selectmen, for hiring consultants, determining costs, pursuing a feasible design to provide access for the mobility-impaired, and developing plans and specifications for the reconstruction and restoration of the Carlton Street Footbridge entrance to Riverway Park, and authorize the Selectmen to apply for, receive and expend state, federal or other grants, aid, loans or reimbursements for such project, or act on anything relative thereto.

Name	Address	Precinct
Cathleen Carrell	27 Monmouth Ct	1
Vincent S. Pitt	1129 Beacon St.	1
Andres Panjabwa	173 Davis Ave	6
Franky Carrell	27 Monmouth Ct	1
Jamie Lawrence	1080 Beacon St. #3d	1
Adelle C. Gearing	73 Monmouth St	1
Jamie F. Lawrence	126 Arroyo St	1
Arnold Goldstein	73 Monmouth St.	1
(Stephen Morse)	54 Powell St.	1
(Geneva Woodruff)	357 Monmouth Ct	1
(Bernard Mehlman)	14 Chatham Circle	1
(Tucker-Kellogg)	14 Chatham Circle	1
(LAZAR)	12 Monmouth Court	1
Maian Jara	32 Craftsland Rd	15
Nancy Medd	149 Walnut St	5



TOWN OF BROOKLINE

Massachusetts

DEPARTMENT OF PUBLIC WORKS ENGINEERING & TRANSPORTATION DIVISION

A. Thomas DeMalo
Commissioner
Peter M. Ditto, PE
Director

CARLTON STREET FOOTBRIDGE

As a result of deliberations on Articles 24 and 25 of the 2002 Annual Town Meeting, there appeared to be a lack of clarity with respect to estimated costs for various options for the Carlton Street Footbridge. Options which required further study were the costs associated with: 1) demolition, 2) ADA compliance with rehabilitation, 3) relocation and, 4) mitigation in the event of removal.

This report presents the findings for the first 3 items as prepared by the Engineering Division. The existing studies by Ammann & Whitney (A&W) and Conley Associates (C.A.) were used as a basis. Item 4 will be evaluated at a later date by a consultant.

DEMOLITION

	Ammann & Whitney	Conley Associates
Bridge Removal	81,000	81,300
Offsite Improvements	140,000	-----
Soft Costs & Project Permitting (MEPA-N.P.C., Pres. Comm., etc.)	-----	25,200
A/E Fees	<u>99,400</u>	<u>34,390</u>
(Final Design, HAER Doc., Contingencies)		
Total	\$320,900	\$140,890

Deleting offsite improvements from A&W's estimate and recalculating the A/E fees, the new total is \$123,400. Assume soft costs are included in A&W's design fee. (25% as opposed to C.A. 15%)

Project cost for demolition ranges from **\$123,000 to \$141,000**

ADA COMPLIANCE FOR BRIDGE REHABILITATION (RAMPS)

Total Ramp Length = 160 ft. Width = 6 ft.

Site Work

Tree removal	6 ea. @ \$300/ea.	1,800
Foundations (sonotubes)	12 ea @ \$400/ea.	4,800

Structural

8" Steel Channels	3 x 160 ft. x \$35/ft.	16,800
6" Steel Columns	80 ft. x \$50/ft.	4,000
1 1/2" Timber Decking (Including Brackets and Clamps)	L.S.	30,000

Architectural

ADA Hand Rails	320 ft. x \$50/ft.	16,000
Decorative Rails	320 ft. x \$150/ft.	48,000
MBTA Protective Screen	100 ft. x \$90/ft.	9,000

Painting

L.S.		<u>10,000</u>
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Sub Total		\$140,400
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A&W's Bridge Rehabilitation Estimate w/o ADA Ramps		<u>600,900</u>
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Total Project Cost		\$741,300
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BRIDGE RELOCATION (MONMOUTH COURT)

Total Length of Bridge = 140 ft.

Total Length of ADA Ramps = 415 ft. Width = 6 ft.

Site Work

Tree Removal	15 Ea. @ \$300/ea.	4,500
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Bridge

Ped. Stairs and Walk	140 ft. @ \$2300/ft.*	322,000
ADA Ramps	415 ft. @ \$865/ft.**	358,975

MBTA - Lowering Wires/Cables	L.S.	25,000
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Landscaping and Site Improvements		<u>110,000</u>
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Sub Total		\$820,475
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Demolition

From above		<u>123,000</u>
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Total Project Cost		\$943,475
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* Unit Price Extrapolated from A&W's estimate for "Replace Bridge"

333 Washington Street • Brookline, Massachusetts 02445-6863
Telephone: (617) 730-2139 Facsimile: (617) 264-6450
<http://www.townofbrooklinemass.com>

Article 13 – Carlton Street Footbridge Resolution

Emerald Necklace Master Plan

"The Master Plan has been formally adopted by both Brookline and Boston and has been the basis for all permitting and funding of park improvements implemented since 1989."

Foreward

The collaborative process that created the Emerald Necklace Parks Master Plan remains as important as the document itself. The master planning process was based on extensive public outreach and participation to ensure that the resulting plan responded to the needs of the park constituencies. For several years, advisory committees in both Boston and Brookline worked closely with D&M staff to direct the planning process. (The same process was conducted on a smaller scale for Franklin Park in Roxbury/Dorchester.)

Completed in 1989, this Master Plan provides a preservation framework for future planning and action. The Master Plan has been formally adopted by both Brookline and Boston and has been the basis for all permitting and funding of park improvements implemented since 1989. For the last year, D&M staff has been working closely with Boston and Brookline to update the plan to reflect current conditions. As you read through this updated plan, or perhaps as you visit the Emerald Necklace Parks first-hand, you will see both the accomplishments and public investment committed to preserving this significant open space.

So where do we go from here -- What has the experience of the past two decades taught us? J. B. Jackson writes in his book, *American Spaces*, that Frederick Law Olmsted's fame must rest on his work as one of the great American artists of the nineteenth century. "He created a uniform style where previously there had been diversity; he perfected a medium and taught a new appreciation of natural beauty." The artistic, environmental and social values that guided Olmsted's creation of the parks are critical for guiding their preservation. As the current stewards of the Olmsted legacy in Massachusetts, we have learned from this great artist, visionary and social reformer that "For every thousand dollars judiciously invested in a park, the dividends to the second generation of citizens possessed will be much larger than to the first; the dividend to the third much larger than the second."

Peter C. Webber, Commissioner
Massachusetts Department of Environmental Management
April 2001

Article 13 – Carlton Street Footbridge Resolution

Grant Agreement for Olmsted Historic Landscape Preservation Program
signed with State

“Future funding for additional capital improvements by the Commonwealth will be contingent upon the City’s adherence to the Master Plan.”

(2) Acceptance of Rehabilitation Master Plan

The City will agree to formally accept the Master Plan as the framework for all future park-related construction. Future funding for additional capital improvements by the Commonwealth will be contingent upon the City's adherence to the Master Plan.

(3) Conservation and Preservation Restriction

The City will agree to execute a Conservation/Preservation restriction for all elements and projects funded through this Agreement.

(4) Establishment of a Municipal Advisory Committee

The City, through its Chief Official, shall establish a local advisory committee representing appropriate community groups and city agencies. The Committee shall meet periodically to ensure adequate local participation in planning and approval of the master plan.

(5) Application for National Register of Historic Places

The City will agree to nominate the park to the National Register of Historic Places, if it is not already on the Register.

C. Maintenance of Books and Records

(1) To keep and maintain such books, records, papers

and other documents as necessary to reflect and disclose fully the disposition of Project Development Funds. At a minimum, such books, records, and accounts shall conform to ARTICLE IV, Section D of this Agreement.

(2) All such books, records and other documents shall be

available at the City for inspection, copying, audit and examination at all reasonable times by any duly authorized

Article 13 – Carlton Street Footbridge Resolution

Excerpts from Final Environmental Impact Report (FEIR) – February 2003

Section 6.2.1 – Management Structure (Introduction)

The Muddy River project area is managed by Boston Parks and Recreation Department, Town of Brookline Parks and Open Space Division and the MDC. The Muddy River parks present a unique challenge because they exist in three jurisdictions with separate resources and funding commitments. As noted in 6.1.1, the parks and its waterway form part of the boundary between Boston and Brookline. Despite the physical boundary of the waterway, many voices have expressed a desire for a "seamless" park system. Park users should be able to enjoy the parks without distraction, moving freely and with pleasure from city to town, path to bridge, woodland to overlook, experiencing the very diversity of spaces Olmsted envisioned.

7.3.3 Update on Carlton Street Footbridge

There were several comments on the plans for the Carlton Street Footbridge. As summarized in a September 6, 2002 letter from A. Thomas DeMaio, Commissioner of Public Works, to the CAC (see Appendix B), the footbridge was the subject of two Warrant Articles at the Brookline Town Meeting in spring of 2002. One article proposed its removal and the other proposed its rehabilitation. In response to those opposing articles, the Selectmen proposed a resolution that was adopted by simple majority after formal debate. In summary, Town Meeting requested that further cost and feasibility analyses be conducted regarding the future of the footbridge. The Engineering Division was further directed to examine the identified cost factors and present the results of the analyses in preparation for the 2003 Spring Town Meeting. Based on these results, the Selectmen will provide an article in the FY '04 Warrant that will appropriate an initial sum for preliminary plans to carry out the option selected at Town Meeting. A total of \$600,000 has been allocated in the Town's Capital Improvement Plan for this purpose. It is anticipated that the Engineering Division will conduct the cost evaluations in their 2002-2003 fall/winter schedule.

6.9.4 Monitoring and Maintenance of Historic and Character Defining Features

The Master Plan for the Emerald Necklace Parks, Jamaica Pond, Olmsted Park, The Riverway, and the Back Bay Fens provides an invaluable resource for the stewards of the Emerald Necklace. The recommendations set forth in the document are intended to provide a framework for decision-making and to lay the groundwork for preserving, rehabilitating and restoring these features.

The work proposed in the EIR will provide historical restoration, rehabilitation or preservation of the existing character defining features. The monitoring of structural integrity and conditions of historical features should be an ongoing process. Scheduling of rehabilitation or repair work for each of these historic features should be included in the annual budget as an estimated contingency item. Immediate issues should be reported by staff and if they are life threatening they should be repaired or stabilized immediately.

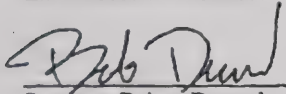
Article 13 – Carlton Street Footbridge Resolution

Memorandum of Understanding signed with State (1999)

“each party to this memorandum agrees to cooperate relative to the Project to ensure the preservation and protection of this unique Olmsted park system.”

8. The parties acknowledge the importance of the tasks outlined in this memorandum and the monumental undertaking required for successful completion of Phase I as well as the entire Project. In recognition of this and of the significance of the Emerald Necklace to its constituents and that successful restoration cannot be achieved except through the collective cooperation of the parties, each party to this memorandum agrees to cooperate relative to the Project to ensure the preservation and protection of this unique Olmsted park system.
9. The effective date of this memorandum shall be the date of execution by the last of the parties to sign.

For the Executive Office of
Environmental Affairs:


Secretary Robert Durand

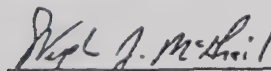
Date: 11/11/99

For the Department of
Environmental Management:


Commissioner Peter Webber

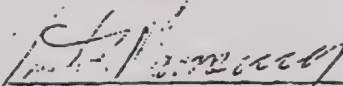
Date: 11/12/99

For the Massachusetts Emergency
Management Agency:


Director Stephen J. McGrail


Date: 11-1-99

For the Boston Water and
Sewer Commission:


Executive Director Vincent G. Mannering

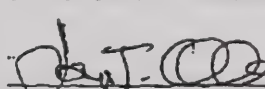
Date: 10/21/99

For the City of Boston:


Mayor Thomas M. Menino

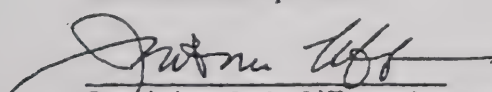
Date: 11/1/99

For the Town of Brookline:


Selectman Joseph Geller, Chairman

Date: 11-4-99

For the Boston Parks
and Recreation Department:

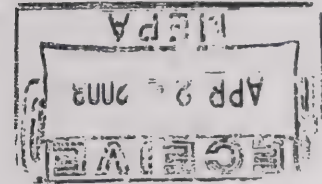
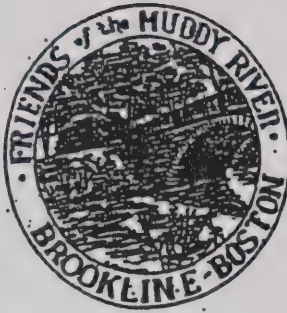

Commissioner Justine Liff, as project manager

Date: 11/4/99

107 Queensberry Street #2
Boston, MA 02215

22 Bowker Street
Brookline, MA 02445
(617) 734-2741

Letter 16
AP



April 24 2003

Secretary Ellen Roy Herzfelder
Executive Office of Environmental Affairs
251 Causeway Street
Boston, MA 02214

RE: MEPA no. 11865

Dear Secretary Herzfelder:

I write on behalf of the Friends of the Muddy River to submit comments on the Final Environmental Impact Report for the Muddy River restoration. These comments are in addition to the comments of the Citizens Advisory Committee of which I am a member. We hope that this project will be done in a careful, conservative way. This applies to the whole undertaking but especially to the Riverway which is our special concern. The Riverway is the most like the original and least changed of all the segments of the Emerald Necklace. It would be ironic if our park which has survived 100 years of neglect, vandalism, mismanagement and intrusions fell victim to inappropriate "restoration."

Dredging

In connection with these concerns we want to voice our objections to bank to bank dredging on the Riverway. This is being put forth as necessary to eliminate phragmites. But most of the shore line on the Riverway does not have phragmites. There are three colonies of phragmites on the Riverway. The largest colony is at the beginning of the Riverway channel down near Park Drive. There is a second mass near the intersection of the Riverway and Brookline Avenue. And there is a third mass from this Riverway-Brookline Avenue intersection to Route 9. Except for the large mass near Park Drive, the Army Corp's proposal to dredge a 30 foot swath down the middle of the river should take care of the phragmites nicely. Where the banks are shaded by large trees the phragmites has not grown. Generally the shoreline is undercut, the banks have fallen in and the remaining shoreline is in fragile condition. (Please see attached pictures). We have been told repeatedly notably by Justine Liff that the original shoreline will be restored. We know that the river was originally deeper and narrower than it is now. We believe that a more conservative management of the dredging on the Riverway will conserve our historic resources. It is worth noting that the river has been dredged two or three times prior to now without destroying the historic resources, notably the remarkable trees.

} 16-1

Pedestrian path

Also under the heading of Historic Resources we are completely frustrated in our effort to secure an amendment to the Master Plan regarding the proposal to add 3000+ square feet of asphalt to the Riverway by paving over the present stone dust pedestrian path on the Boston side of the river. We had written to the Secretary, tracing the changes in this proposal from its origin in the draft Master Plan in the late 80's and the subsequent editions which dropped this proposal ('90, 92, and 99 editions) to the 2001 Master Plan which regurgitated the original. Basic to the 90's Master Plans was the idea that because of its narrow and fragile character the Riverway should direct those who need pavement to the paved road on the Brookline side. The soft stone dust path on the Boston side, adjacent to the medical area, would remain a less structured pedestrian way.

In his Draft Record of Decision, April 16, 2002, page 12, the Secretary provided that the Master Plan which he described as a "living document" might be amended. This statement was folded into a paragraph dealing principally with the Carlton Street Footbridge. We have had a brief informal discussion with Patrice Kish of the DEM Historic Landscape program who told us she has "no institutional memory" of this issue or the different editions of the Master Plan. On the advice of our attorney we spoke with Margaret Dyson, the acting head of the Boston Park Department who said she has "no institutional memory" of the issue or the Master Plans. The FEIR now says that any path treatment has to be consistent with the Master Plan but it does not say which one. We believe that part of the problem is the loss of Commissioner Justine Liff and other personnel changes. For the record we are willing to participate in a meeting to discuss this issue. The meeting should also include representatives of the bicycle community which has not advocated for the asphalt.

16-2

Carlton Street footbridge

Also for the record, the Carlton Street footbridge is essential to park users. We hope that Secretary Herzfelder reiterates the previous Secretary's position with respect to Brookline's responsibility to restore this important access and egress point for all park users.

16-3

Wildlife resources

From the beginning of the EIR process we have advocated that the proponents secure advice and assistance from the New England Aquarium, the Arnold Arboretum and Mass. Audubon. From time to time the Camp Dresser McKee representative has talked about contacting the Aquarium and Audubon but the FEIR has nothing specific. Last year the DEP recommended using volunteers to rescue and

16-4

relocate wildlife. We renew this demand for the protection of existing wildlife resources, including carp, snapping turtles and muskrats..

16-4 cont.

Back Bay Yard

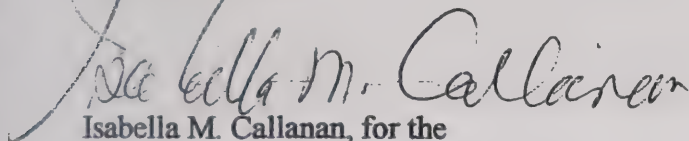
Section 8 of the FEIR proposes to do nothing about the alleged mountain biking activity near Park Drive in the Boston Park Department's facility known as the Back Bay yard. Our group first complained about this in 2001. Bicycle advocates now tell us that the activity going on here is stunt biking which involves a younger age group than mountain biking. This is a healthy recreational activity for young people but is an anachronism in this location; Worse still the stunt bikers are eroding the berm which is part of the flood control system. We have advocated that another location be found for this activity. Also the Back Bay yard should be restored to its role as a maintenance facility for the Boston Park Department. In fact this would be a great location for Boston and Brookline to cooperate in their maintenance of the Emerald Necklace..

16-5

16-6

Thank you for this opportunity to add our concerns to those of the Citizens Committee.

Very truly yours,

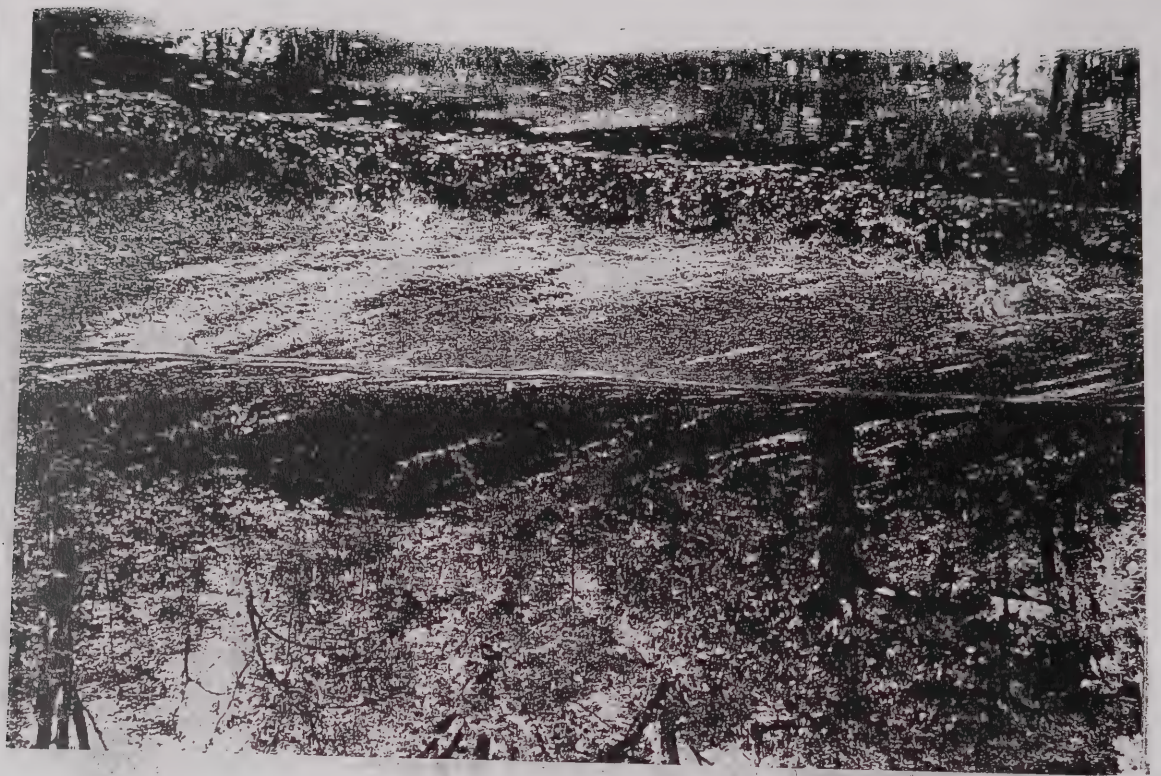


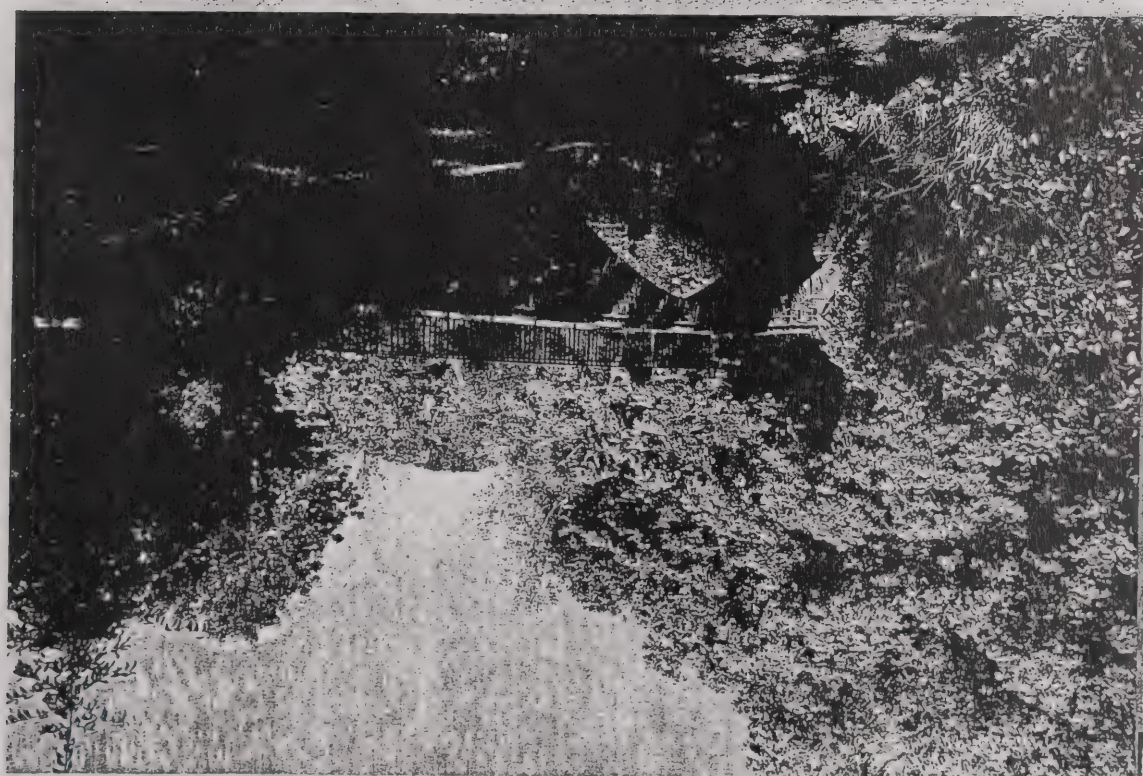
Isabella M. Callanan, for the
Friends of the Muddy River

Riverway shoreline

November 2002

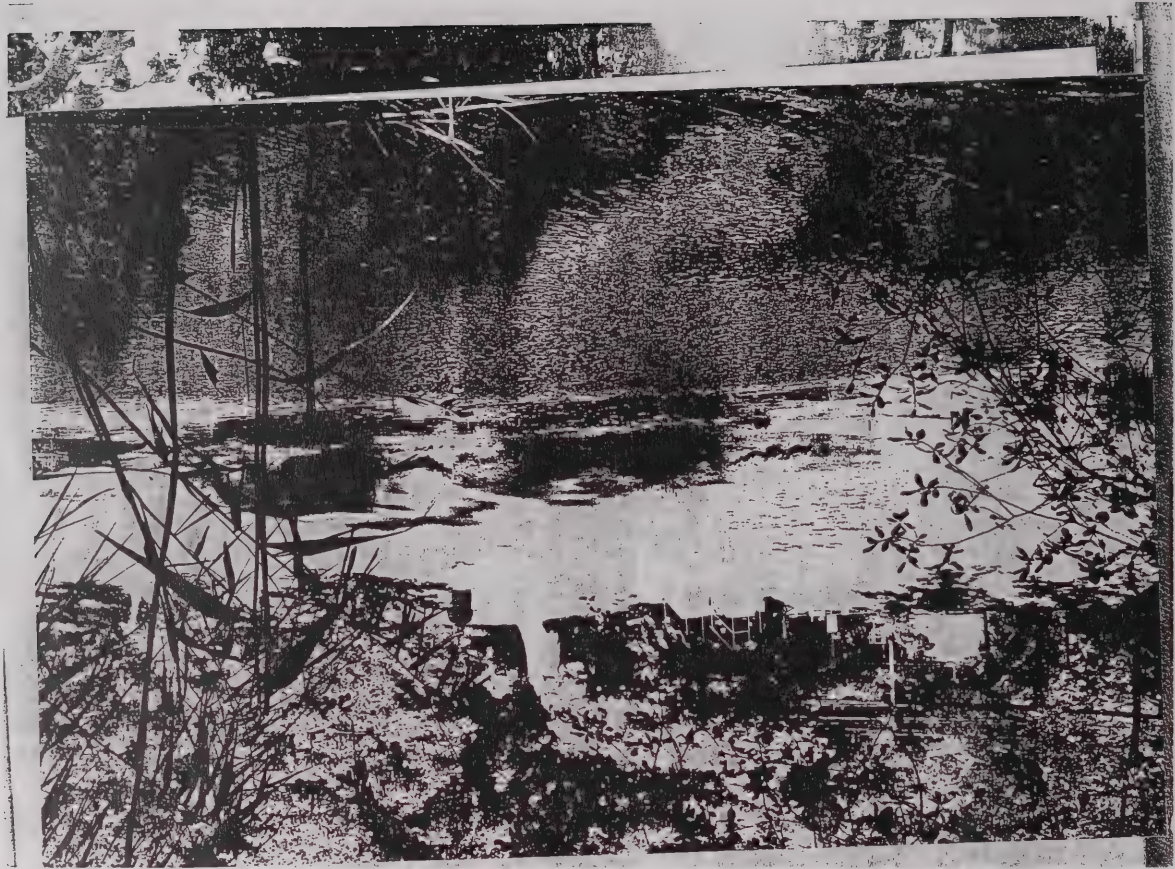








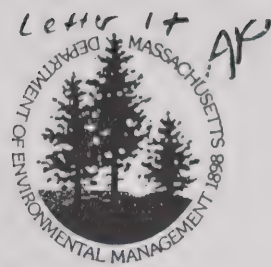






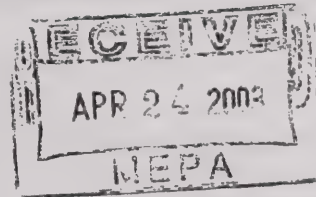


COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
SOUTHEAST REGIONAL OFFICE
P.O. BOX 66, SOUTH CARVER, MA 02366
PHONE: 508-866-2580 FAX: 508-866-7736
www.mass.gov/dem



Governor Mitt Romney
Lieutenant Governor
Deputy Governor
Secretary
Commissioner

April 24, 2003



Secretary Ellen Roy Herzfelder
Executive Office of Environmental Affairs
Attn: MEPA Office, Arthur Pugsley, EOE 11865
251 Causeway Street, Suite 900
Boston, MA 02114

RE: Phase 1 Muddy River Flood Control, Water Quality and Habitat
Enhancement, and Historic Preservation Project

Dear Secretary Herzfelder:

On behalf of the Department of Environmental Management (DEM),
I am writing to provide comments to you regarding this Final Environmental
Impact Report (FEIR).

While Boston and Brookline are the proponents of this project, the
Department of Environmental Management (DEM) has had a long
continuous involvement in promoting the preservation and protection of this
nationally recognized park system.

Since 1984, the Commonwealth, through the DEM's Olmsted
Historic Landscape Preservation Program has made an extraordinary
commitment to the preservation of the Olmsted legacy throughout
Massachusetts. With funding from the 1984 and 1987 open space bills,
approximately \$16 million in historic landscape preservation funding from
the Commonwealth has been provided to Boston and Brookline for the
Emerald Necklace, most of which has required no cash match.

The Commonwealth's commitment to reclaiming the Olmsted legacy
in Boston and Brookline is evidenced not only in the investment of capital
funds for park rehabilitation projects but also in our leadership role in the
creation of the Emerald Necklace Master Plan (1989, updated 2001).
Through an extensive collaborative process involving local citizens, local
and state officials, park advocates, Olmsted scholars, planners and
preservationists, a Master Plan was crafted to provide a decision making
framework to guide all future planning and action. The principles guiding

the creation of the Master Plan and the future restoration are the same principles that guided Olmsted in his creation of the Emerald Necklace; flood control, water quality, habitat enhancement and park making.

DEM has also been providing since 1992 extensive staff planning and engineering services to assist Boston and Brookline to implement the Master Plan and to address the flooding that occurred along the Muddy River in 1996 and 1999.

These efforts have culminated in the Phase I Muddy River Flood Control, Water Quality and habitat Enhancement and Historic Preservation Project. The implementation of this project provides a tremendous opportunity to ensure the long-term preservation of Olmsted's finest work in its entirety by accomplishing the five objectives of the Phase I Project: increasing flood control, improving water quality, enhancing habitat, restoring the historic landscape and instituting Best Management Practices (BMPs). In this context DEM supports this project as making a significant contribution to implementing the Emerald Necklace Master Plan.

SUMMARY COMMENT

Staff of DEM reviewed the DEIR for this project and submitted a detailed ten-page comment letter to MEPA addressing 14 specific issues. We have reviewed the FEIR using our DEIR letter as the basis to determine to what degree the proponents have addressed our original DEIR comments in the FEIR and have found that the proponent have satisfactorily addressed only 7 of the 14 comments as outlined in our letter dated April 8, 2002. (attached) Several fundamental issues **still remain to be addressed**: These are:

1. The content of the maintenance and management plan for the project and the upland park area as was required by the DEIR certificate and will be required by the MOU and the COE;
2. The financing of the maintenance and management plan after the completion of the construction period during the subsequent years of the life expectancy of the project;
3. The incorporation of the lessons learned from undertaking the Charlesgate portion of this project into the design and final engineering of the dredging of Muddy River from Ipswich Street to Wards Pond;
4. The incorporation of specific mitigation measures that protect the extant historic and cultural resources located in the project area
5. The future action to be taken by the proponents to preserve the Carlton Street Footbridge;
6. The preparation of a final BMP plan following the completion of the on-going BMP Watershed Study and the Pilot BMP structural study.
7. The recognition that flood-proofing individual structures is an integral part of comprehensive approach to address flooding along the Muddy River.

Although we didn't previously comment on the Back Bay Yard, DEM also has serious concerns about the Proponents FEIR response on this issue.

DEM believes the issues raised above are essential to the successful implementation of the project. Upon review of the FEIR, DEM is not satisfied that the FEIR provides the specificity and commitment required to ensure that the completed project will be managed and maintained at a sufficient level to achieve a 50 year life expectancy and to meet the goals of the Emerald Necklace Master Plan. DEM believes that these are significant deficiencies and therefore recommends that no additional state funding be transferred to the Proponents until the issues are satisfactorily addressed.

SPECIFIC COMMENTS

FEIR Section 1- Introduction

DEIR comments 1-Project Description, 2-Project area Boundaries, 3-Project Objectives and 4. -Preferred Project.

DEM's comments were correctly incorporated into the FEIR text. This project Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement and Historic Preservation Project is first phase of a multi phase plan to fully restore this park system as envisioned in the Emerald Necklace Master Plan. The intent of DEM's DEIR comments was to underscore the importance of clearly describing the specific project currently under review by MEPA and to distinguish it from the other phases of the overall plan through a consistency in the narrative description and graphic boundary delineation.

DEIR comment 5-Flood Proofing of Property.

The federal, state, city and town governments are prepared to invest \$92 million in planning, designing and constructing this plan. Boston, Brookline and MDC will invest additional funds to protect this significant public investment by providing an enhanced level of maintenance upon completion of the project. It is critical that the institutions and individual property owners follow the example of the MBTA, MFA and Northeastern University and take pro-active steps to mitigate against flood loss of buildings and contents located below flood level.

There was no acknowledgement of DEM's DEIR comment or discussion of this issue in the FEIR. DEM reiterates its DEIR comment: "The preferred plan is designed to provide flood protection from a storm event similar to that which occurred in 1996. Flood events of a higher intensity will flood the adjacent lands and property owners need to anticipate such events. Property owners need to design new construction or expansion of existing buildings by greater than 50% so as to conform with the National Flood Insurance Standard as found in the Massachusetts State Building Code and applicable City of Boston and the Town of Brookline zoning and building regulations."

FEIR Section 2-Dredging and Sediment Management

DEIR comment 6.

The majority of the cost, short-term impacts to the immediate environment and the long-term efficacy of approach taken towards meeting the five goals of this project are largely determined by the dredging method used to remove sediment from the Muddy River, Leveret Pond and Wards Pond. While the FEIR discusses the overall dredging

alternative analysis very well, the removal of debris prior to and during dredging still needs to be addressed.] 17-2 con

The Charlesgate experience with dredging the sediment from the channel demonstrated that the physical characteristics of the bottom sediment were not conducive to the use of a hydraulic dredging approach. This raises the question of what might be the condition found for the stretch of the Muddy River from Ipswich Street to Wards Pond. The main issue with Charlesgate bottom condition was not the presence of debris such as shopping carts, bicycles, tires, clothing, wood, trash etc., but that the bottom contained significant amount of cobble. The extent of cobble necessitated the contractor to switch from hydraulic dredging to mechanical dredging, use a different on-site sediment storage system than originally planned and to change the dredge material disposal site as the material no longer could pass the 6" maximum diameter requirement for solids to permit the material to be used for cover material for landfills.

The FEIR recognized this in section 2.3.3 with the provision "...that additional sediment testing will be done during design to determine if cobbles and boulders (greater than 6 inches in diameter) are present in the Muddy River bottom sediment. Hydraulic dredging is expected to remain the preferred method. If there are areas where hydraulic dredging is not feasible, mechanical dredging will be used".

This raises a number of questions not addressed in the FEIR:

1. The additional testing of the physical characteristics of the bottom sediment needs to be done early in the final engineering phase of this project, using electronic sonar equipment or other procedures. The testing must be approached in a manner that will ensure accurate data. If there are only a few small pockets of cobble and boulders; it is not a big issue. However, if there are considerable stretches of the river bottom containing cobbles and boulders it will have profound implications on the method of dredging, location of staging areas, impact on the shore and surrounding parkland environment during construction, the sequencing of the bioengineering and restoration work, location and cost of dredge material disposal. 17-3
2. The FEIR suggests that the entire river will be dredged first and then post dredging activities (2.3.6) will occur. These activities include stabilization of the banks, repair of riprap, mitigation planting (restoration of the landscaping), historic treatment and decommissioning of staging areas. As Charlesgate work has shown, mechanical dredging is far more intrusive on the river banks and immediate upland areas as there is the need to access the river with heavy equipment to a much greater degree than with hydraulic dredging. The proposed project schedule is two and maybe three years of construction from the initial dredging through site restoration. Rather than the entire riverbank be exposed for the entire dredging period, it may be necessary to proceed geographic area to geographic area, with the work from dredging through post dredging activities to be completed in one geographic area before moving to the next geographic area. The Proponents need to explore this approach more fully to analyze potential benefits of minimizing disruption to adjacent neighborhoods as well as costs. 17-4

3. Impacts and Mitigation Measures (2.5) and Responses to Comments on the DEIR (2.6) are predicated on the assumption that hydraulic dredging will be the method of sediment removal. There is no discussion of whether mechanical dredging needs to be employed. 17.5
4. Mitigation (2.5.9) provides that "the contractor will prepare plans, for approval – by Engineer, on dredging operation, disposal of materials and methods by which the contractor will control impacts of the dredging operation" It is important that these plans be also subject to review and approval by the permitting agencies, funding agencies and the Oversight Committee. 17.6

FEIR Section 3-Wetland and Water Quality Impacts and Mitigation for Preferred Dredging Alternative and Section 4 Wetlands Protection Act and Water Quality Certification Compliance

DEIR comment 8

The comment letter from DEP should be used as a guide in terms of the applicability of the Massachusetts Wetlands and Water Quality Laws and Regulations and proposed mitigation of construction-related impacts in the areas of sediment quality, water quality and wetlands.

Sections 3 and 4 of the FEIR assume that hydraulic dredging will be used as the dredging alternative for the entire stretch of the Muddy River from Ipswich Street to Wards Pond.

Based on the real-world experience with undertaking the Charlesgate portion of the project and the discussion in Section 2 of this FEIR, mechanical dredging will most likely need to be used to some degree for the dredging of the Muddy River between Ipswich Street and Wards Pond. There is no discussion in this section of the impact of this method or recommendations of how to mitigate such impacts, if this method of dredging needs to be utilized. 17.7

While the FEIR makes a good case for the need for in-stream sedimentation basins (4.3.2), the second paragraph on p.4-11 seems to argue the opposite in saying: "the overall dredging project is designed to improve the capacity of the river to provide flood control, storm damage prevention. These basins will neither further improve nor diminish the improvement provided by the dredging project and are therefore considered to have a neutral impact on these two interests." If this is the case, why install the in-stream sedimentation basins at all? 17.8

FEIR Section 5-Watershed Evaluation and Best Management Practices

DEIR comment 7-Basin-wide BMPs

The FEIR (p.5-1) states "The goal of the BMP plan for the watershed is to reduce solids loadings in the river by 30% by 2006. A reduction of 30% will expand the life of the dredging project from approximately 30-50 years to 50-70 years".

DEM believes that a 50-70 year life span for this project is realistic and that the full implementation of the BMP plan is essential to protect the \$92 million public investment in this project.

The DEIR states the importance of the BMP plan towards meeting the project's goals. "The project will institute Best Management Practices to minimize re-sedimentation rates by capturing more sediment before it reaches the river, ensuring major dredging will not be required again for nearly 70 years; improve water quality by reducing the volume, bacteria, nutrients and other contaminants entering the river as runoff; maintain and protect the public's investment by improved maintenance in the watershed; and contribute to the attainment of fishable/swimable conditions for the Charles River."

The DEM DEIR comment recommended that the FEIR contain:

1. BMP plan for the Muddy River Watershed that includes:
 - a. Description of all measures to be undertaken
 - b. Planning, permitting and construction schedule
 - c. Project proponents commitment to implement the plan
 - d. Dedicated funding source
2. BMP plan to be expanded to address all stated project objectives
3. Work/plan/schedule for proponent's implementation of basin-wide BMPs in 2002
4. BMP study to determine which system-wide BMPs to be instituted by proponents

The Proponents have made considerable progress since the DEIR in designing and implementing a BMP program by initiating an BMP watershed study and an pilot study to determine the effectiveness of BMP structural measures; including in the FEIR a more detailed BMP plan and a renewed commitment to provide 50% of the engineering and construction costs of installing \$4.2 million of structural BMPs throughout the Muddy River Watershed; and Brookline placing on the May 2003 town meeting agenda enhanced storm water standards requiring new or re-developed sites to retain storm water on site.

DEM's DEIR BMP recommendations that still need to be addressed are:

1. The FEIR does not identify a dedicated funding source nor present a strategy suggesting such a source for land taking and site specific costs associated with the installation of the structural BMPs, the installation of a particle separator to control drainage from the Massachusetts Turnpike adjacent to Charlesgate, the recommended increase in street sweeping and catch basin cleaning practices by Boston, Brookline, MDC, MHD and Newton and the future maintenance of the structural BMPs to ensure effective sediment removal rates.
2. The FEIR does not contain a commitment by the proponents or MDC, MHD and Newton to undertake the recommend BMPs.

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17.10

3. As the pilot study and the BMP watershed study are still underway, the FEIR was not able to include a definitive watershed BMP plan with an engineering, permitting and construction schedule.

17.11

FEIR Section 6-Management Structure and Maintenance Plan

DEIR comment 9 Management Structure

The Preferred Management structure as outlined in the FEIR does not appear to meet the requirements of the Secretary's draft and final Record of Decision (dated April 16, 2002 and July 29, 2002 respectively). Both decision documents required implementation of a management structure through the creation of an oversight body representing the range of stakeholders. The final Record of Decision clarified the roles and responsibilities of the oversight committee. However, the Preferred Public/Private Partnership includes only superficial involvement of the oversight body. It is not enough for the Partnership to report back to the oversight body. Rather, the oversight committee must fully participate in the management structure to satisfy the Secretary's requirements of participating in the development of performance standards and identifying benchmarks; providing independent review to ensure the project goals are met including long-term management and maintenance goals; monitoring and evaluating compliance of all permits and approvals, and promoting close coordination between the Proponents, MDC and MBTA. There must also be a mechanism in place for the owners to address management issues raised by the oversight body. The creation of the oversight committee is a step in the right direction. However, the Proponents must work to further develop a preferred management structure that allows the oversight body to participate fully in the management responsibilities as required by the Secretary

17.12

DEIR comment 9 Maintenance Plan

The DEIR Certificate stated, "Obtaining enforceable maintenance and management commitments is a necessary condition for the FEIR to be found adequate."

In reviewing the maintenance plan submitted as part of the FEIR, DEM has found that it does not address the comments in our April 8, 2002 letter, nor does it respond to the Secretary's clear direction for revision of the plan as outlined in the DEIR Certificate. The plan contained in the FEIR continues to lack the specificity to assure that enforceable maintenance and management commitments have been made to protect the public's investment in this project.

The underlying necessities for management and maintenance are to preserve the integrity of the historic designed landscape and to ensure that the flood control component of this project is not undermined.

17.13

Minimum contents of an acceptable maintenance and management plan for the park system must include:

1. management philosophy and vision
2. management, staffing, equipment, tasks and schedules with associated costs
3. monitoring procedures to assess continued health and integrity of the project

4. measurable performance standards including not limited to the following:
 - a. sediment removal
 - b. erosion control
 - c. water quality
 - d. wetland and upland plantings
 - e. fish resources
 - f. wildlife resources
 - g. historic resources including both landscape and structures
 - h. culvert maintenance
 - i. structural source control
 - j. treat control BMPs
 - k. litter collection
 - l. graffiti removal
 - m. rodent and geese control
 - n. vegetation management including control of invasive species
5. guidelines for preservation maintenance and monitoring
6. management structure and coordination
7. management policies related to protection and sustainable use of the parks including but not limited to:
 - a. vehicular management
 - b. programming, permits and unauthorized use
 - c. partnership and mou's
 - d. pet control
8. management reporting procedures and enforcement
9. training requirements

17.13
cont.

DEM is available to help the Proponents develop a Maintenance and Management Plan that meets the requirements of the Secretary's Certificate.

DEIR Comment 10 MEPA Annual Update

90% of DEM's recommendations in terms of a MEPA Annual Update have been endorsed by the proponents and included in the FEIR.

DEM recommends that in addition to MEPA and the CAC, the annual report be also provided to the Oversight Committee, funding and permitting agencies and noticed in the MEPA Environmental Monitor; and that a mechanism be established for the proponents to take necessary actions to address issues raised both in the report and in comments from the CAC and the funding and permitting agencies.

17.14

DEIR Comment 11 Emerald Necklace Environmental Improvements Committee

Muddy River Restoration Project Maintenance and Management Oversight Committee (MMOC) has been established as the oversight body specified in the Secretary's decision documents. Since its creation in October 2002, the committee has been working diligently, without the benefit of support staff, to organize itself and prepare for the review of this document. The establishment and involvement of the MMOC is a critical component in the establishment of enforceable maintenance and

17.15

management commitments by the Proponents. Its role is to guarantee accountability and transparent decision-making for a sufficient time beyond the completion of the improvements. It is therefore necessary for the Proponents to engage the MMOC's full participation in the numerous unresolved issues related to the maintenance and management.

17.15
cont.

As was recommended in DEM's DEIR comment letter inclusion of EOTC (or MHD) and the MBTA in the make-up of the oversight committee is an important component in the coordination with outside agencies to ensure a successful implementation of the project. The FEIR describes aspects of this project that both MHD and MBTA will be responsible for implementing. It is critical that they be added to the make-up of the MMOC so the interface of planned work by these two transportation agencies within or within the watershed area of the project will be well coordinated with the project as a whole.

17.16

DEIR Comment 12 Citizens Advisory Committee

DEM's DEIR comment on this subject applauded the CAC for their commitment to assist with the review of this project and recommended that the CAC should continue its advisory role to MEPA process and whatever management structure is established.

DEM notes that the FEIR states: "Following the submittal of the FEIR, the CAC will receive annual updates (and the MEPA annual report—section 6.4.3) from the project proponents regarding the status of the Muddy River Improvements. The CAC's role extends beyond the Muddy River project as advisors to the Secretary on the entire Emerald Necklace for aspects of the Emerald Necklace Masterplan that need review under the MEPA process".

DEIR comment 13 Maintenance Costs

DEM believes that the importance of maintaining and managing of the completed project is essential to protect the public investment of \$92 million to plan, design, engineer and construct this project.

DEM wants to recognizes that extensive state and federal funds have been and will be invested in preserving this important Olmsted Legacy; i.e.

1. It is anticipated that the COE will be the federal sponsor for the non-Charlesgate portion of this FEIR project. The Commonwealth's usual funding arrangement with COE-partnered projects is to cost share the non-federal share of the planning, engineering and construction cost 50/50 with the municipal partner(s) in the project implementation. In terms of this project, the Commonwealth has assumed 100% of the non-federal share of the first \$42 million with the understanding that the proponents along with Metropolitan District Commission, the Boston Water and Sewer Commission and the Massachusetts Highway Department would be responsible for 100% of the maintenance of the project during the life of the project. This project was funded differently to recognize the substantial financial commitment that would be needed on the part of

Boston and Brookline to manage and maintain the completed work in a manner that is consistent with the Emerald Necklace Master Plan.

2. In addition to the \$16 million that DEM has invested in historic landscape preservation grants for the Emerald Necklace, it has invested an additional \$400,000 of state funds combined with MEMA's expenditure of \$4.8 million in pass-through Federal FEMA and HUD mitigation funds to undertake planning and engineering and early construction for this FEIR project.
3. The Massachusetts Legislature has appropriated \$24 million "... for the purpose of partially matching the federal funds committed by the army corps of engineers to undertake the emerald necklace muddy river restoration project to provide flood protection to the Massachusetts Bay Transportation Authority and other parties, to provide environmental and historic preservation benefits to the commonwealth; provide that prior to any expenditure of funds from this item, the city of Boston and the town of Brookline shall enter into a memorandum of understanding, so-called with the executive office of environmental affairs and the executive office of administration and finance that details the local portion of the required non-federal matching funds and establishes a long term maintenance and management program for said project"

The FEIR addresses this issue with the following statements thus pushing Boston and Brookline's financial commitment to this project to a future date:

1. (p.6-45) "The proponents will seek to fund this level of maintenance (maintenance plan), subject to appropriation and the availability of funds"; and
2. (p.6-19) "Two new agreements will be renegotiated as part of the continuing work on the Muddy River Project. The first is an agreement on management structure and maintenance responsibilities that will include the MDC as part of the agreement and a second agreement to replace the November 1999 MOU."

While the FEIR states (p.6-18) that "the proponents agreed to accept responsibility for costs of maintaining and managing the project including implementation of BMPs once Phase I is complete.", the FEIR does not provide the level of commitment required in the MOU, the DEIR Certificate, DROD and FROD for Phase 1 Project.

Given this lack of commitment, DEM recommends that no additional state funding be transferred for this project until the appropriate level of commitment has been satisfied.

DEM recommends, as it did in the DEIR, that Boston and Brookline establish a dedicated maintenance capital trust account to fund the maintenance of the Phase 1 Project. Boston and Brookline can establish this dedicated account with the savings

generated by the Commonwealth agreeing to fund the entire non-federal share of the first \$42 million of the anticipated COE/state/city/town funded project. The normal funding arrangement with a COE sponsored project is for the state and the local sponsors to split the 35% non-federal share or \$15.2 million in this case. Boston and Brookline thus will each save approximately \$7.6 million in avoided costs associated with the project.

17.18

MDC should also seek legislative authorization for the establishment of a similar dedicated funding stream for their share of the required operation and maintenance.

Section 7.3 -Historic Resources and Section Measure to Protect Existing Historic and Cultural Resources

DEIR Comment 8.2

The Phase 1 Project Area is an important and nationally recognized cultural landscape that has suffered from decades of deferred maintenance. DEM has supported the Proponents' efforts to restore, maintain and protect this significant cultural resource by providing substantial state funding, with no match required, to develop and implement the Emerald Necklace Master Plan. Even though the Master Plan provides recommendations for the specific parks and features, more importantly, it establishes a comprehensive approach to the restoration of the cultural landscape as a unified system.

A necessary requirement of this project is for the Proponents to continue to maintain and protect the historic and character defining features of the restored park. However certain actions described in the FEIR are counter to this requirement.

First, the Carlton Street Footbridge is facing a very uncertain fate. The Footbridge, at one time, provided public access to the Riverway from Carlton Street. But now, nearly a century later, the bridge is closed, the access cut off and the structure faces demolition by neglect. As an integral part of the park system, the Master Plan recommends the preservation of the Footbridge issue of the preservation of the Carlton Street Footbridge. As a result of public concern expressed to DEM, the issue of the preservation and protection of the footbridge was raised in our DEIR letter. Because preservation is a recommendation of the Master Plan, the Secretary's Certificate assumed that the Town of Brookline would act expeditiously implement the rehabilitation and re-opening of the Footbridge. However, the FEIR response gives no indication of a planned effort to do so. Instead the FEIR lays out a very uncertain future for the historic feature of the landscape.

17.19

Second, DEM is alarmed by the Proponents' decision to allow the continued use of the Back Bay Yard Area by dirt bike users. This use has resulted in significant earth moving and manipulation by others of a landscape under the jurisdiction of the Boston Parks Department. Although the use of this area does not currently threaten the river's water quality it does threaten the physical quality of the landscape through the degradation caused by the unauthorized use of this area by dirt bikes.

17.20

Frederick Law Olmsted left to the city of Boston and the town of Brookline an extraordinary design legacy held in public trust by the parks agencies. As steward of this

resource it is a responsibility to protect these parks as cultural and environmental resources. Given the Commonwealth investment in the restoration of the landscape, the Proponents lack of response to address these preservation issues is cause for concern by DEM. As a result, DEM feels strongly that the Proponents need to address the issue of future preservation of the bridge and the Back Bay Yard Area.

The overriding concern with regards to the maintenance of historic resources is that the operative and only verb used in Section 6.9.4 is "should". This does not meet the intent of DEM's DEIR comment recommending the FEIR must include mitigation measures that protect the extant historic and cultural resources within the Project Area.] 17.21

Section 9. Rare Species

The FEIR comment letter from Division of Fisheries and Wildlife should be used as a guide for fish and wildlife resources.] 17.22

Section 10. Environmental Mitigation and Section 61 Findings DEIR comment 8.2 Independent Environmental Monitor)

Although the FEIR incorporates DEM's DEIR recommendations on the need for an environmental monitor to insure that the historic and environmental MEPA and permit conditions are fully-implemented, it does not meet the requirement of the Secretary's DEIR certificate.] 17.23

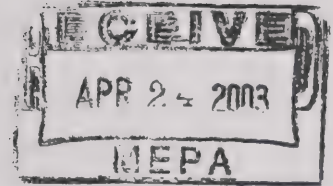
In closing, given the significance of this project, DEM is confident that the issues raised in this letter will be resolved. The successful completion of this project is essential to provide flood protection for the Muddy River Watershed, and to further the preservation of the Olmsted legacy in Boston and Brookline.

Very truly yours,


Peter C. Webber
Commissioner

Letter 18
AP

April 24, 2003



Ms. Ellen Roy Herzfelder
Secretary of Environmental Affairs
State of Massachusetts
Attn: MEPA Office
Arthur Pugsley, EOE No. 11865
251 Causeway Street, Suite 900
Boston, MA 02214

Re: Final Environmental Impact Report, EOE No. 11865,
Phase I, Muddy River Flood Control, Water Quality and Habitat Enhancement,
and Historic Preservation Project

Dear Secretary Herzfelder:

We are in receipt of the Final Environmental Impact Report (FEIR) dated February 2003,
and write with reference to the Carlton Street Footbridge.

As elected Town Meeting Members from Precinct One of Brookline, Massachusetts – the
location of the Carlton Street Footbridge – we wish to go on record as voicing our
continued opposition to the inclusion of the Carlton Street Footbridge restoration as part
of the above-referenced project. We stand by our April 5, 2002 letter directed to former
Secretary Robert Durand (included in the FEIR in Appendix A, Exhibit V) and attached
hereto as Attachment 1.

18-1

We would like to take this opportunity to comment on the FEIR as follows:

Section 7.2, p. 7-1, Volume 1, FEIR Main Report, states:

- *"The Carlton Street Footbridge is historically significant. Brookline must act in good faith to expeditiously implement the elements of the Master Plan within its control, including rehabilitation and reopening of the footbridge."*

The Town of Brookline's commitment to the Emerald Necklace Master Plan, as stated in that Plan, is to "*study the feasibility of restoring the footbridge.*" The Town of Brookline, its Selectmen and its Town Meeting are pursuing its commitment to study the feasibility of restoring the footbridge. In fact, Brookline's Town Meeting voted on May 29, 2002, under Warrant Article No. 24, as follows:

18-2

"NOW THEREFORE, BE IT RESOLVED:

That the Selectmen are requested to provide an article in a FY04 Warrant that requests that \$30,000 be appropriated in the FY04 CIP for the cost of preliminary plans for and other preliminary costs associated with the reconstruction, relocation and removal of the Carlton Street Footbridge, inclusive of mitigation, with provision, in the event of either reconstruction or relocation, for full ADA compliance;" (See Attachment 2)

18-2
cont.

The statement in FEIR 7.3.3 describing the Selectmen's Town Meeting Resolution, *misrepresents its intent* in an important way: it fails to mention that the Resolution requests funds from the 2004 budget to explore the **three** options: **rehabilitation, removal and relocation inclusive of mitigation**. To date, the subject of mitigation has not been explored and must be addressed prior to any decision on the future of the bridge.

Moreover, the language in this section concerning the results of Brookline's Engineering Department's "cost and feasibility analyses" in 2002-03, should not be construed as meaning that the Engineering Department's findings *alone* would be the basis for choosing a particular option to be presented at Spring 2003 Town Meeting in a Selectmen's Warrant Article -- thereby co-opting the **2002 Town Meeting decision to fund an open and even-handed analysis of the three options from the 2004 budget**.

18-3

Section 7.2, p. 7-1, Volume 1, FEIR Main Report, it is stated:

- "Any change in Brookline's commitment to rehabilitate and reopen the footbridge will require, at minimum, the filing of a Notice of Project Change."

The Emerald Necklace Master Plan, the 2002 DEIR Certificate and the 2003 FEIR in Section 7.2 acknowledge the Town's **option** of deciding against rehabilitation by describing the process to be followed should that be the Town's decision. It is certainly clear from the above that the **Town is not mandated or contractually bound to restore the footbridge**, either by the Master Plan, the DEIR, or the FEIR, **contrary to assertions by proponents for restoration**.

18-4

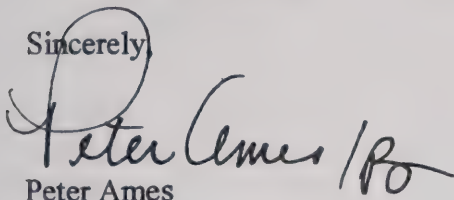
Although we the undersigned Town Meeting Members wholeheartedly support the Muddy River Restoration Project, we must reiterate our opposition to the restoration of the Carlton Street Footbridge. Our position continues to reflect the sentiment of the overwhelming majority of our constituents in Precinct One, who have consistently elected Town Meeting Members opposed to restoration of the footbridge in the last three Town elections.

Ms. Ellen Roy Herzfelder

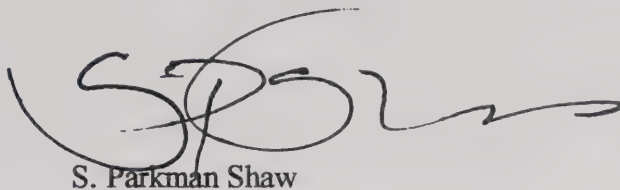
Page 3

As Brookline Town Meeting Members from Precinct One—where the Carlton Street Footbridge is located—we are grateful to have had this opportunity to present our community's position.

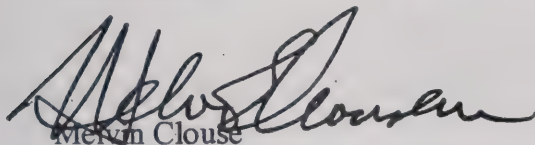
Sincerely,



Peter Ames



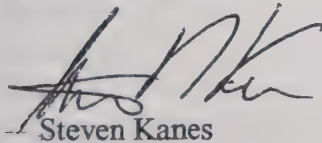
S. Parkman Shaw



Melvin Clouse



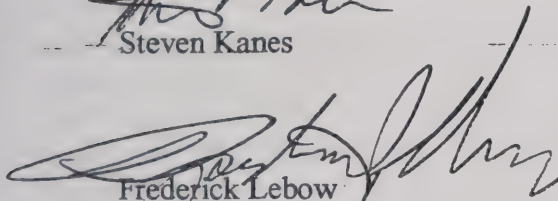
Loretta Slover



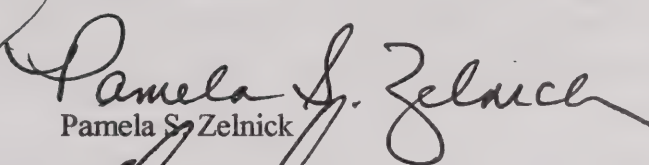
Steven Kanes



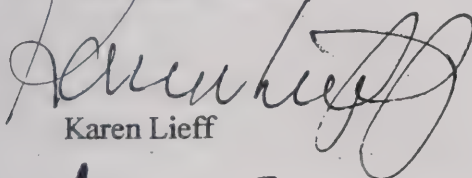
Susan Williams



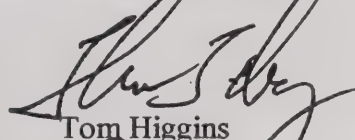
Frederick Lebow



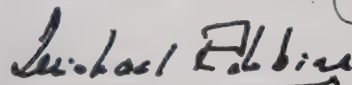
Pamela S. Zelnick



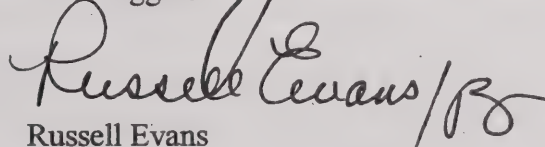
Karen Lieff



Tom Higgins



Michael Robbins



Russell Evans



John A. Schemmer

Attachments (2)

cc: Town of Brookline Selectmen: Deborah Goldberg, Chairman, Robert Allan,
Joseph Geller, Gilbert Hoy, Donna Kalikow
Richard Kelliher, Town Administrator

Not listed
on Certificate

April 5, 2002

RECEIVED

APR 5 2002

MEPA

Mr. Robert Durand
Secretary of Environmental Affairs
Attention: MEPA Office
Arthur Pugsley, EOEa No. 11865
251 Causeway Street, Suite 900
Boston, Massachusetts 02144

Subject: Draft Environmental Impact Report; EOEa #11865
Phase I Muddy River Flood Control, Water Quality and
Habitat Enhancement, and Historic Preservation Project

Dear Secretary Durand:

We have received the Environmental Impact Report (EIR) on *Phase I Muddy River Flood Control, Water Quality and Habitat Enhancement and Historic Preservation Project* (the "Project"). We understand that this will be the major EIR and that comments on subsequent phases not addressed in this EIR or in the proposed budget are appropriate at this time.

As Brookline Town Meeting Members from Precinct One—the location of the Carlton Street Footbridge—we wish to go on record to express our overwhelming opposition to the inclusion of Carlton Street Footbridge restoration as part of the longer term Project. The Carlton Street Footbridge (CSF) has been closed, derelict and unusable for 25 years. Our opposition to restoration reflects the position of over 200 immediate neighbors in the vicinity of the CSF, as well as 12 of 15 elected Town Meeting Members in the Precinct. Our opposition is based on standards affirmed by the *Emerald Necklace Master Plan*, the framework of the entire project.

1. **COST.** The *Emerald Necklace Master Plan* (ENMP) states that projects should be of "reasonable cost" and offer "substantial public benefit (p. 14)." At close to \$1 million dollars, estimates for the CSF restoration far exceed any benefit to the Town. Based on observation and interviews of current park users, about 20 pedestrians might use the footbridge at peak times to enter Olmsted Park (Conley Associates Report to Brookline Selectmen). The customary entry at Longwood Station, 250 yards from the bridge, would continue to be the major entry into the Park in that area.

2. **HISTORICAL SIGNIFICANCE.** The historical argument for restoration rests on the assertion that the CSF is an integral part of Olmsted's vision of Riverway Park. Research by Olmsted scholars reveals the opposite. The entry point at Carlton Street in Olmsted's

1881 plan was already a well-used path to a Boston-Albany Railroad flag stop at grade level. Olmsted merely found it convenient to extend this path into his proposed park. The first indication of a footbridge appears 11 years later, at the request of a citizen of the Town as a safety measure. By the time the bridge design was chosen in 1894, Olmsted was no longer actively engaged in design or implementation of the Riverway Park project (Pressley Associates Report to Brookline Selectmen, page 14). It is clear that the CSF was built as an expedient solution created by others, and not an integral part of Olmsted's vision of the park. The CSF was given historical status as a contributing element not because of its form or function, but because it was built one year before the end of the arbitrarily designated time period of Olmsted's involvement in Riverway Park.

3. **HANDICAPPED ACCESSIBILITY.** The ENMP gives priority to projects that "encourage design solutions...that provide for... handicapped accessibility (page 3)" and "access... with special regard... for those with special needs (page 145)." Two successive feasibility studies commissioned by the Town (Ammann & Whitney and Conley Associates) stated that ADA compliance waivers would be needed as a condition for footbridge restoration. The reports concluded that the addition of ADA accessibility would destroy the footbridge's historicity (Ammann & Whitney, page 12). It is unlikely that these waivers can be obtained because there is no alternate accessibility within a reasonable distance, if at all. Since restoration of the footbridge without ADA accessibility is not possible because of compliance issues, the bridge restoration project finds itself caught between the assertion by some that it is historically significant, and the reality that it cannot be restored and retain any historical significance.

4. **SECURITY AND SAFETY.** A further ENMP priority is to "...enhance public safety... (page 3)." Neighbors near the footbridge overwhelmingly feel that safety and security are compromised by a restored footbridge, which would link the neighborhood directly to an unlit park without a residential community on the Boston side. This is supported by the Terrell Report to Brookline Selectmen, which states that crime ramps up as you move from Brookline through the park into the Boston side of Riverway Park. The report further states that people in the neighborhood would not feel safe walking in the neighborhood if the footbridge were opened. Moreover, Brookline police officers interviewed for the Terrell Report all variously identified Riverway Park as unsafe at night. Besides crime, a second issue of concern for public safety is the footbridge's location at a hazardous corner with reduced visibility, heavy with vehicular traffic in two directions. The Town should be uneasy about luring pedestrians to a footbridge at such a dangerous crossing.

For all the reasons stated above—excessive cost; doubtful historical significance; lack of handicapped accessibility; security and safety concerns—the Brookline community most affected by the CSF strongly believe that the CSF should not be included in the Project.] V-1

The Project planning process required input from local communities through the Citizens Advisory Committee. However, the majority of the community adjacent to the CSF believe that their input was neither acknowledged by the Brookline members of the Citizens Advisory Committee, nor communicated to Project officials. As Brookline Town Meeting Members, we are grateful for this opportunity to make our community's position known.

Very truly yours,



Peter Ames



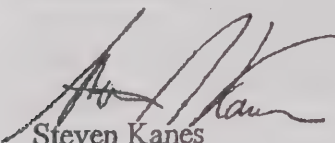
Michael Robbins



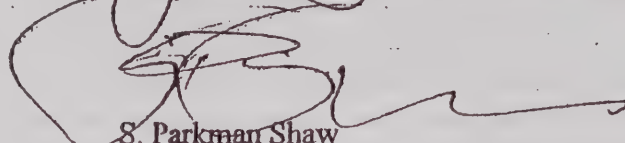
Melvin Clouse



John A. Schemmer



Steven Kanés



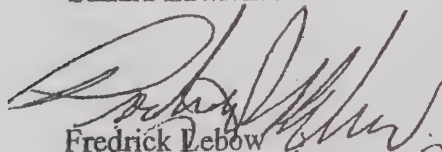
S. Parkman Shaw



Sandra Lawrence



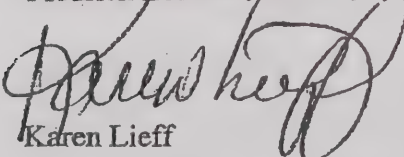
John Weiter



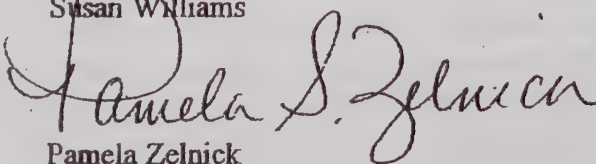
Fredrick Lebow



Susan Williams



Karen Lief



Pamela Zelnick

cc: Town of Brookline Selectmen:

Donna Kalikow, Chair, Robert Allen, Joseph Geller, Deborah Goldberg, Gilbert Hoy

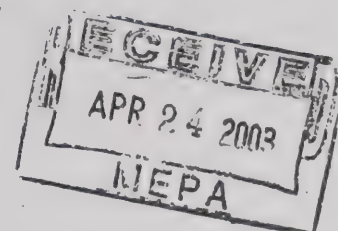
Richard Kelliher, Town of Brookline

Thomas Brady, Town of Brookline

M A S C O

Medical Academic and Scientific Community Organization, Inc.

Secretary Ellen Roy Herzfelder
Executive Office of Environmental Affairs
251 Causeway Street
Boston, MA 02114



April 24, 2003

RE: Support of the Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project. Review comments on the February 2003 FEIR.

Dear Secretary Herzfelder,

I am writing, on behalf of MASCO's 19 member institutions in the Longwood Medical and Academic Area (LMA), in support of the Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project.

MASCO provides services to 19 institutions in the Longwood Medical and Academic Area (LMA) of Boston (please see members listed below). We work to provide open space, traffic, and access improvements, as well as construction coordination for the LMA. As abutters to the Muddy River and Emerald Necklace, we have been a long-standing advocate for park and river improvements. The park is an important "gateway" to the LMA. It also provides our patients, visitors, doctors, faculty, staff and students a place to exercise, commute and reflect. In 1996 and again in 1998, our institutions suffered millions of dollars in damages due to the flooding of the Muddy River. It is critical to us that the flooding situation be mitigated as soon as possible. "No action" is not an option to us.

A number of the issues that MASCO raised in the DEIR have been addressed in the FEIR. We greatly appreciate the proponents' willingness to work with MASCO's construction coordinator as the project nears implementation phases. We are pleased that the proponent plans the use of drilled piles, as there is research equipment that is very sensitive to pile driving in the LMA. We also appreciate all of the proponent's efforts related to noise and odor control, including the BPRD hotline, given that a number of our student residence halls and classrooms abut the project. In an effort to assist with BMPs, we plan to work with the proponents' related to use of designated MASCO member parking lots, by residents, during street sweeping.

We appreciate the proponents' willingness to work with MASCO planners on appropriate mitigation, including summer scheduling, of work on Netherlands Road. We understand that this road closure is a temporary condition only, and continue to encourage the proponents to consider all other options for siting of equipment in this general location.

19-1

375 Longwood Avenue, Boston, Massachusetts 02215-5328 617 632-2310 Fax: 617 632-2759

MEMBER INSTITUTIONS:

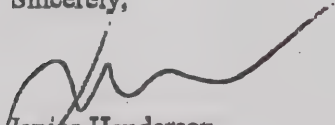
Beth Israel Deaconess Medical Center • Brigham and Women's Hospital • Children's Hospital Boston • Dana-Farber Cancer Institute • Emmanuel College • Harvard University (Medical School, School of Dental Medicine, School of Public Health) • Joslin Diabetes Center • Judge Baker Children's Center • Massachusetts College of Art • Massachusetts College of Pharmacy and Health Sciences • Massachusetts Mental Health Center • Simmons College • Temple Israel • Wentworth Institute of Technology • Wheelock College • The Winsor School

Our remaining concerns include scheduling (phasing, timing and sequencing), ensuring that MDC's roles and responsibilities be committed to by some entity (given the possibility that the MDC will be eliminated by the state), and potential negative traffic impacts on roadways due to road lane closures. We assume that these will be addressed by the proponents through the course of the project.]19-2
]19-3
]19-

As the entity that manages construction coordination among projects in the LMA we would like to have the opportunity to review the construction bid documents before they are disseminated. By doing so, we believe that we will be able to identify potential issues early enough to suggest appropriate mitigation measures that will benefit both the contractor and the impacted institutions.]19-

We thank you for this opportunity to comment.

Sincerely,



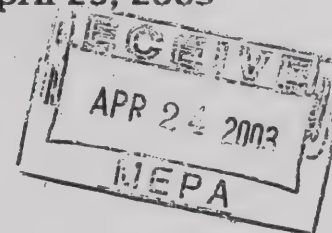
Janice Henderson
Sr. Planner

*AP***JAMAICA PLAIN REGAN YOUTH LEAGUE**

P.O. Box 2418
Jamaica Plain, MA 02130

Telephone: 617-983-1563
E-mail: reganyouthleague@aol.com
Web site: www.reganyouthleague.org

April 23, 2003



Ellen Roy Herzfelder, Secretary
Executive Office of Environmental Affairs
Attn: MEPA Office
EOEA#11865
MEPA Analyst Arthur Pugsley
251 Causeway Street
Boston, MA 02114

FAX: 617-626-1180

Dear Ms. Herzfelder,

As president of a youth baseball league that has been playing for over thirty years on Daisy Field, which is located in Olmsted Park in Jamaica Plain, I am writing to express our concerns about Phase 1 of the proposed Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project. We are specifically interested in the proposed use of the northerly of the two baseball diamonds on Daisy Field as a staging area for the dredging of Leverett Pond, and the proposed reorientation of the diamond upon completion of the project.

Thanks the work of over 100 volunteers, the Regan Youth League provides organized youth baseball for 600 players ages 6-15 on various fields in Jamaica Plain in April, May and June. Our teams are filled to capacity and we use every field available extensively, including both diamonds on Daisy Field. This coming season we have over 70 games and 80 practice sessions scheduled on Daisy Field: half of which are scheduled for the northerly diamond. The current plan would make that field unavailable for a minimum of 14-16 months. The loss of one baseball diamond for even one season would present an unacceptable hardship to our program: one of precious few available to our inner city youth.

We strongly urge you to consider using the former MDC Kelly Skating Rink site, approximately 200 yards north, as the staging area. Project planners, in the Draft Environmental Impact Report dated December, 2001 rejected that site rather than risk possibly disturbing an historic pool containing rare three-spine stickleback fish. Given the dire consequences for our youth sports program (and others that use Daisy field), We suggest it would be advisable to ask the engineers planning this project to revisit the notion of using the Kelly Rink site, and use all available technology to avoid disturbing the surrounding environment. 20

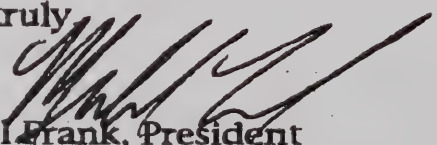
According to the preliminary report, after the proposed construction is complete, "the northerly field will be reoriented away from Leverett Pond and rebuilt with a grass infield...to reduce sediment runoff problems that currently exist. The historic view of Leverett Pond will be restored because the backstop will no longer be at the pond" (page 6-87).

While a beautifully maintained grass infield would be ideal, it would be more practical to maintain the current clay, or "skin" infield. Infielders risk serious injury fielding ground balls on uneven grass. Even with the best efforts of the Boston Parks and Recreation Department, the extensive use of Daisy Field makes it all but impossible to maintain a perfect lawn, witness the current state of the outfield grass at Daisy Field.

The two baseball diamonds are now situated at opposite corners of Daisy Field. I regret I do not know the precise dimensions of Daisy Field, but simple observation makes it obvious that reorienting only the northerly diamond would put it too close to the southerly one. This would result in the bizarre, and potentially dangerous, situation where the left fielder in one game would be facing the right fielder in another game, both with their backs to the action in each other's game! Desirable as the "historic view" may be, it should not be restored at the expense of safe, historic active use of the park. There must be a way landscape architects could design and plant the area around the existing field to prevent infield clay from draining into Leverett Pond. 20-2 20-3

On behalf of the players, coaches, and organizers of the Jamaica Plain Regan Youth League, thank you for considering our concerns as you plan this important major project.

Yours truly



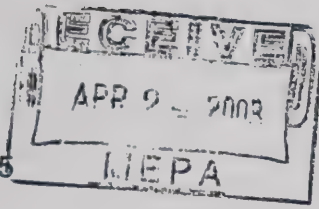
Michael Frank, President

Friends of Leverett Pond

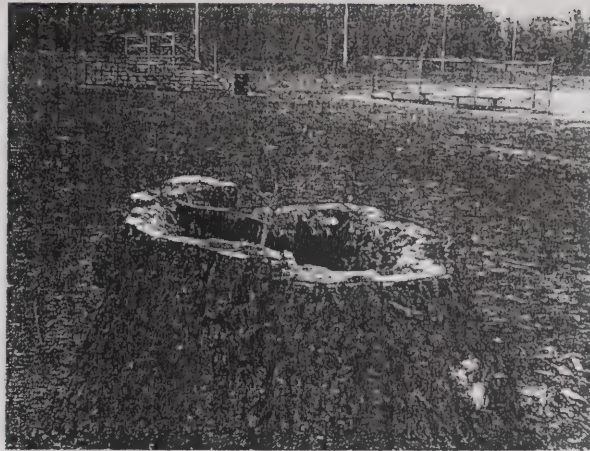
A committee of the High Street Hill Association

Letter 21

209 Pond Ave.
Brookline, MA 02445
April 23, 2003



Ellen Roy Herzfelder, Secretary
Executive Office of Environmental Affairs
251 Causeway St.
Boston, MA 02114



Trees in Olmsted Park, Boston show effect of decades of neglect

Re: Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project (EOEA #11865)

Dear Secretary Herzfelder:

We are writing to comment on the FEIR as activists who have been involved in Emerald Necklace affairs for over 20 years, including as members of the Emerald Necklace Citizens Advisory Committee and as the current Co-Chairs of Friends of Leverett Pond.

Maintenance is one of the primary concerns of the Project. To quote the Proponents' statement in the FEIR, *"The project proponents agree that the level of maintenance described in Section 6 is appropriate. **The proponents will seek to fund this level of maintenance, subject to appropriation and the availability of funds.**"* While we understand the municipalities' normal funding protocol, this sentence, nevertheless, releases the Proponents from responsibility for funding the maintenance they agree is appropriate. In other words, it reduces the responsibility to a matter of convenience.

Alternatively, the text of the legislative act that authorized this funding is quite explicit – *"prior to the expenditure of funds from this item, the city of Boston and the town of Brookline shall enter into a memorandum of understanding, so-called, with the executive office of environmental affairs and the executive office of administration and finance that details the local portion of the required non-federal matching funds and establishes a long-term maintenance and management program for said project."*

21-1

In addition to our concern that there is no mechanism to assure the Proponents will deliver on their obligations, we wish to point out that there are important restoration item omissions in the report. First, there is an issue of erosion on the two outer islands of Leverett Pond. These islands are severely eroded – tree roots seem to form the primary structure – and will likely crumble into the water, thus requiring restoration. The shorelines of these islands need stabilization. There is no plan for this work in the FEIR.

21-2

Second, the headwall at the north end of Willow Pond has deteriorated. The DEIR response from the Proponents with regards to this historic structure was *"Rehabilitating this headwall did not appear necessary at this time."* We do not agree with this assessment. We ask that you

21-3

Friends of Leverett Pond

A committee of the High Street Hill Association

investigate and reconsider the islands in Leverett Pond and the Willow Pond headwall for inclusion as items for restoration.

] 21-3
cont.


Finally, Section 7.4 dealing with Parkways should include more details on how their character will be protected and what kinds of maintenance will be performed. Details including regulations, standards (in Boston and Brookline) and historic treatment should be included in the Report. For example, many if not most of the trees on MDC property are in decline. Serious attention needs to be paid to pruning and replanting, and well as modifying salting operations to reduce damage to root systems.

] 21-4

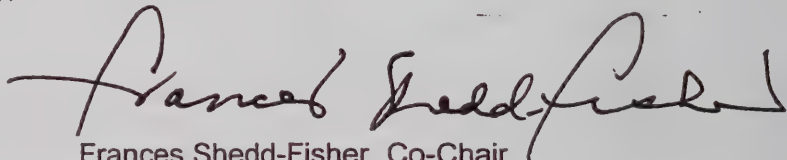
In summary, our primary concerns are 1) enforcement of accountability, 2) Leverett Pond island stabilization, 3) the Willow Pond headwall, and 4) the maintenance of the Parkways.

In closing, it is clear that the intent of this legislation is to ensure the long-term maintenance of the park system. To reverse a generation of neglect and to achieve this goal, there need to be mechanisms which carry financial and legal penalties for non-performance, or at least guarantee some minimum level of maintenance.

Sincerely,



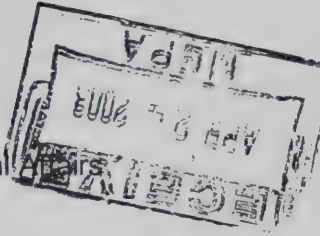
Hugh Mattison, Co-Chair



Frances Shedd-Fisher, Co-Chair

Copy to: Arthur Pugsley, MEPA Analyst

Ellen Roy Herzfelder, Secretary
Executive Office of Environmental Affairs
251 Causeway St.
Boston, MA 02114



209 Pond Ave.
Brookline, MA 02445
April 21, 2003

Re: Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project (EOEA #11865)

Dear Secretary Herzfelder:

I am writing to comment on the FEIR and specifically on the lack of progress made by the Proponents since your office issued the DEIR Certificate in April 2002, which stated *"this Certificate assumes that the Town of Brookline will act in good faith to expeditiously implement the elements of the Master Plan within its control, including the rehabilitation and reopening of the Carlton Street Footbridge."*

In April 2002, the Brookline Preservation Commission received a letter from the Massachusetts Historical Commission (MHC) which requested *"that further documentation and proposed plans be submitted to MHC as early in the planning stages as possible so that all alternatives for its treatment may be considered."* In over a year, in spite of a request from the ENCAC to the Board of Selectmen dated February 21, 2003 (see Attachment 1) to *"provide results of any research you have completed with the Massachusetts Historical Commission"*, there has been no consultation with MHC as specified in the DEIR, which states *"The proponents should also consult with MHC regarding the alternatives under consideration for the Carlton Street Footbridge."*

22-1

In the intervening year, Brookline has managed to complete a cost study of three options, and is proposing that more consultants be hired this summer to determine potential mitigation costs. The results of the cost study were substantially the same as Town-commissioned consultant reports completed over a year ago, all of which stated that restoration was feasible. But they have never discussed the footbridge status with MHC. Brookline seems more intent on spending money for more studies – which allows delay – than in following the recommendations of its own consultants for restoration. Delay, under the guise of needing more information, has been the apparent strategy.

The Memorandum of Understanding, which advanced \$7.1 million from FEMA for Charlesgate dredging, signed by the Proponents in late 1999 states *"each party to this memorandum agrees to cooperate relative to the Project to ensure the preservation and protection of this unique Olmsted park system"*. Yet the Chair of the Board of Selectmen states that Brookline's commitment is not "clear" to her. The Town Counsel suggests that this MOU applies only to Phase 1 elements, despite the reference to "the Project" and the DEIR Certificate explicitly defining the historic status of the Footbridge.

22-2

The DEIR Certificate states *"Any change in the Town's commitment to rehabilitate and reopen the footbridge will require, at a minimum, the filing of a Notice of Project Change (NPC) to the Muddy River Project."* No NPC has been filed, because an option for the Bridge has not been chosen; however there has also been no leadership in the Town or City to move toward the MHC recommendation of protecting a character defining feature.

22-3

Indeed, language in the FEIR, prepared by the Proponents, uses the flowery rhetoric *"the recommendation set forth in the document (ENMP) are intended to provide a framework for*

22-4

decision-making and to lay the groundwork for preserving, rehabilitating and restoring these features." This language is in direct conflict with the apparent intent to delay any decision on the future of the Footbridge until the FEIR is accepted. The public interest should be protected against such a cavalier attitude toward the significant investment offered by the state.

22-4
cont'd

Section 6.9.4 of the FEIR states "one of the requirements for Phase 1....is that the Proponents will be required to maintain the historic and character defining features of the restored parks." The historic and character defining features include "views and vistas...circulation systems and site entries...and furnishings and structures." The Footbridge is a structure providing the primary Brookline entry for pedestrians at an overlook which provides a vista at the widest point in the park. The Proponents, by continuing to discuss demolition, are concurrently violating their statements in the FEIR. Statements in the FEIR supporting adherence to the ENMP, yet behavior which does not commit to restoring the Footbridge, are disingenuous. The Proponents should understand that their commitment, as reaffirmed in the 1999 MOU, is to the entire Project, not just one Phase, and is not selective depending on the political pressure or fiscal vagaries of the moment.

22.5

In the FEIR, Section 7.3.3, Proponents state "the Engineering Division was further directed to examine the identified cost factors and present the results of the analyses in preparation for the 2003 Spring Town Meeting. Based on these results, the Selectmen will provide an article in the FY'04 Warrant that will appropriate an initial sum for preliminary plan to carry out the option selected at Town Meeting."

However, in response to a letter that the ENCAC sent to Chairman Goldberg on February 21, 2003, in which the ENCAC asked for "the final text, or at least a substantially complete draft, of any warrant article(s) proposed relating to the restoration", Chairman Goldberg responded "we anticipate that the consultant services which might be necessary for mitigation analysis [for the three options for the Footbridge -- demolition, relocation, and restoration] can be purchased through the proposed \$30,000 appropriation, if approved." (See Attachment 2). The schedule of the FEIR has thus been lengthened, if indeed restoration was ever intended at all, because the Selectmen have since stated that the above interpretation of their 2002 resolution to Town Meeting is incorrect.

The public deserves the assurance that the Proponents will honor their commitments. Such assurance, I believe, can only be gained through use of a surety bond or other legally-enforceable agreement which carries financial penalties for non-performance of both capital improvements and operating and maintenance costs as identified in Table 6-10 of the FEIR.

22.6

Alternatively, I ask that a supplemental environmental impact report which specifically identifies the actions and schedule the Proponents will follow to preserve historic elements such as the Footbridge, be required.

22.7

I fully support this project and look forward to its successful completion, in accordance with the DEIR Certificate.

Truly yours,

Hugh Mattison

Hugh Mattison

Copy to: Arthur Pugsley, MEPA Analyst

LCH 23
A

**MUDDY RIVER RESTORATION PROJECT
MAINTENANCE AND MANAGEMENT OVERSIGHT
COMMITTEE**

RECEIVED

APR 25 2003

MEPA

Secretary Ellen Roy Herzfelder
Executive Office of Environmental Affairs
251 Causeway Street
Boston, MA 02114
ATTN: MEPA Unit

April 22, 2003

Dear Secretary Herzfelder,

RE: Phase I Muddy River Flood Control, Water Quality and
Habitat Enhancement, and Historic Preservation Project FEIR;
EOEA # 11865

The Muddy River Restoration Project Maintenance and Management Oversight Committee (MMOC) has been working hard since its formation in October of 2002 to do our part to ensure the success of the Muddy River Restoration Project. The full project continues to have our solid support, and we look forward to working with all of the stakeholders involved as the restoration project continues.

We do not want to see any delay in this project as it moves ahead, but we do feel there are a number of specific issues in the FEIR that need to be addressed further to ensure the project's success, and to enable our committee to carry out the responsibilities we were given on the project.

Our comments here focus primarily on the proposed Management Structure for the project; we also have a number of comments on issues related to maintenance.

Management Structure

Establishing an effective, functional management structure is vital to ensuring the success of the planning and implementation of this complex and far-reaching project in a multi-jurisdictional park system. In recognition of this, both the Draft and Final Records of Decision for the waiver for Phase One, the Charlesgate portion of the project, require the "(i)mplementation of a management structure, through the creation of a permanent oversight body..."

23-1

Simone Auster
Emerald Necklace
Conservancy
Kate Bowditch (Chair)
Charles River Watershed
Association
Kelly Brilliant
Fenway Alliance
Ed Burke
Emerald Necklace CAC
Erin Chute
Brookline Parks and Open
Space Division
Paula Cortes
Boston Society of Landscape
Architects
Margaret Dyson
Boston Parks and Recreation
Department
Frances Allou Gershwin, Esq.
Emerald Necklace CAC
Gary Gross
Brookline Preservation
Commission
Patrice Kish
Department of Environmental
Management
Ellen Lipsey
Boston Landmarks
Commission
Jack Malone
Muddy River Restoration
Project Technical Advisory
Committee
Kay Mathew
Boston GreenSpace Alliance
Arlene Mattison
Brookline GreenSpace Alliance
Chris McCombs
Massachusetts Emergency
Management Agency
Cara Metz
Massachusetts Historic
Commission
Samantha Overton Bussell
Metropolitan District
Commission
George Proakis
Emerald Necklace CAC
Marian Sabal
Emerald Necklace CAC
Betsy Shure Gross
Executive Office of
Environmental Affairs

The MMOC is this independent oversight body. The MMOC's responsibilities are significant, and include participation in the development of performance standards for maintenance, review of project progress, monitoring compliance with permits and approvals, and coordinating activities on the project.

The DEIR Certificate states, "The final EIR... should ensure that the management structure is compatible and consistent with the requirements I have laid out in this Certificate and in the Charlesgate Final Record of Decision." Yet the preferred management structure in the FEIR, a Public/Private Partnership between Boston, Brookline, MDC (or superceding park management agency) and ENC, does not provide any formal role in the management structure for the MMOC.

Without a clearly articulated position in the management structure of the project, the MMOC could be marginalized and ignored, rendering it unable to perform its mandated functions. In order to "ensure that project goals are met," the MMOC must be at the table when plans and decisions are made. It is not enough to have the Public/Private Partnership report back to the MMOC on a periodic basis. There are numerous project decisions, permit requirements, and mitigation measures that are yet to be developed. The MMOC, while not a manager, must be able to provide real-time, detailed comment and suggestion as these processes occur.

To meet the requirements established in the Certificate on the DEIR, and the Draft and Final ROD, the proponents must include specific commitments to the MMOC in the Memorandum of Agreement (MOA) and Memorandum of Understanding (MOU) for the project. These commitments should include at a minimum:

1. Regular, ongoing communication between the proponents' staff members and the MMOC, including but not limited to the participation of the MMOC chair and administrator at project meetings, site visits, and planning sessions; working with the MMOC on the budgeting process; regular reporting to the MMOC on maintenance progress; sharing of all data collected on the project.
2. Coordination between Boston, Brookline, the MDC (or park agency), the ENC and the MMOC for parkland management planning.
3. Coordination between Boston, Brookline, the MDC (or park agency), the TAC and the MMOC on development, implementation and maintenance of BMPs.
4. Commitments to funding for the MMOC staff position.

With a clearly articulated position and role in the management structure, evidenced and enforceable through language in an MOA and an MOU, the MMOC would be able to function effectively as an oversight body.

We ask that you and your staff work to identify an appropriate, enforceable mechanism through which to accomplish this. We hope there is a way to do this without a Supplemental EIR, but if no other enforceable mechanism can be found, we ask that you require one.

Maintenance

Maintenance remains one of the most critical elements of this project, and is the primary reason that this project needs an effective oversight committee. Poor maintenance practices caused many of the problems this project is now attempting to

23-1
continued

23-2

correct: excessive sedimentation from storm drains; lack of control of invasive species such as *Phragmites*; collapsing stream banks; eroding parklands and pathways.

The proponents recognize the need for significantly better maintenance of their parklands, their drainage infrastructure, and their non-point source pollution control programs. They have committed to implementing BMPs and improving BMP maintenance in the FEIR, and have developed a park maintenance plan. Both Boston Mayor Thomas Menino and the Brookline Board of Selectmen have committed in written communication to the Secretary to providing the funding necessary to meet their maintenance obligations through both Capital Improvement Program budgets and annual operations budgets.

Plans for both BMP implementation and maintenance, however, are still evolving. The details of the final BMP plan will depend largely on the results of the BMP pilot program, which is still underway. The "measurable environmental performance standards" that were required by the DEIR Certificate have not yet been developed. The proponents acknowledge in their July 1, 2002 letter to the Secretary that the BMP plan suggested in the FEIR may need to be modified based on the results of the pilot program, and that such modification would require the filing of a Notice of Project Change to the FEIR.

23.3

Similarly, plans to implement park maintenance plans are outlined in broad generalities. Improvements in park maintenance will require both permanent additional staff, and funds for contracting to private vendors. The proponents have committed to making these important investments in general, but the specifics of these commitments will be determined annually through city and town budgets.

23.4

Successful maintenance requires constant attention, vigilance, and funding. The MMOC has been established specifically to ensure that the proponents' commitments to maintenance are carried out over the long term. We have been tasked with working with the proponents to develop performance standards for the project. We are the only body with the specific charge of ensuring that all permit obligations are met. Our committee makeup, including technical experts, citizen advocates, and public officials, provides us with the unique ability to participate in the ongoing planning for improved maintenance, analyze maintenance implementation, and serve as a forum to find solutions to problems as they arise.

Everyone involved in this project agrees that better maintenance in the future is essential. The future is long, however, as the life of this project must be. The MMOC's role is critical to ensuring that maintenance obligations will not be forgotten or ignored, regardless of turnover of elected officials or staff members, or the erosion of public interest.

Commitments to maintenance, and thus the MMOC, must be articulated in the MOU and MOA for the project.

23.5

Project Implementation

There are many potential short-term impacts associated with this project, and the maintenance and mitigation efforts that will be required during construction are significant. As planning and design continues, the MMOC must work directly with the proponents and their contractors to ensure that the plans meet the requirements set out by the permitting agencies, and that they function as designed during construction.

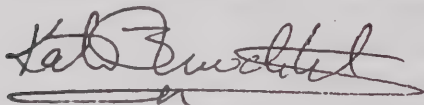
There are many specific, important issues to be resolved prior to construction. These include:

- Project phasing
- Selection of dredging technique and appropriate mitigation
- Development of detailed construction-period water quality performance standards
- Development of a wet weather management plan
- Development of erosion and sediment control plans
- Development of *Phragmites* monitoring plan
- Development of a detailed monitoring plan for the proposed in-stream sedimentation basins

To function as an effective oversight body, the MMOC must be included as these issues are tackled. The Independent Environmental Monitor who will be hired should report regularly to the MMOC and should work closely with the MMOC's Administrator in the field.

The MMOC looks forward to continuing our work with the proponents, their consultants and contractors, and the many other boards, committees and individuals involved in this project. We are excited about the future of this great resource and thank you for supporting an open, participatory process. Please feel free to contact us should you have any questions or comments. We look forward to your certificate.

On behalf of the MMOC,



Kate Bowditch, Chair

Cc: Antonia Pollock, Margaret Dyson, Boston Parks and Recreation Department
Thomas DeMaio, Brookline Department of Public Works
Erin Chute, Brookline Parks and Open Space Division
Emerald Necklace Citizens Advisory Committee

Not listed on Certificate

Letter 24
APR

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APR 16 2003 **MUDDY RIVER RESTORATION PROJECT**
MAINTENANCE AND MANAGEMENT OVERSIGHT
COMMITTEE

MEPA

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APR 10 2003

EXECUTIVE OFFICE OF
ENVIRONMENTAL AFFAIRS

Simone Auster
Emerald Necklace
Conservancy
Kate Bowditch (Chair)
Charles River Watershed
Association
Kelly Brilliant
Fenway Alliance
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Management Agency
Cara Metz
Massachusetts Historic
Commission
Samantha Overton Bussell
Metropolitan District
Commission
George Proakis
Emerald Necklace CAC
Marian Sabal
Emerald Necklace CAC
Betsy Shure Gross
Executive Office of
Environmental Affairs

Lt. General Robert B. Flowers
Commander
US Army Corps of Engineers
441 G Street NW
Washington DC 20314 - 1000

April 8, 2003

in support

Dear General Flowers:

On behalf of the Muddy River Restoration Project Maintenance and Management Oversight Committee (MMOC), I am writing to share with you our committee's support for and dedication to the Muddy River Restoration Project. Our committee, formed in October of 2002, is supported by the project proponents, Boston and Brookline, as well as by the Massachusetts Executive Office of Environmental Affairs. Our responsibility is to provide independent review of the project, and to serve as a forum for discussing ongoing maintenance and management issues as the project progresses.

The full restoration of the Muddy River is critical if this river corridor is to continue to function successfully as a waterway, and as a natural oasis in an urban environment. The river's flood carrying capacity has been significantly impaired by a variety of factors: increased urbanization of the watershed; dense stands of *Phragmites* that have restricted flows; and undersized culverts. The water quality and habitat values of the river are poor, due in large part to accumulated sediments. The public's ability to use and enjoy the parks, which are listed on the National Register of Historic Places, is diminished by the *Phragmites* stands, as well as by eroding banks and frequent floods.

The potential value of this resource in such an intensely developed region is enormous. The project poses challenges in great part because of the urban nature of the project area, but these are challenges that can be met. This park and river system, designed and built as a solution to a multitude of problems, is a great example of what careful engineering can do. We believe it is a perfect project for the US Army Corps of Engineers to participate in, and hope you will support the full scope of the project.

We look forward to the opportunity to work with you.

Sincerely,

A handwritten signature in dark ink, appearing to read "Kate Bowditch", written over a horizontal line.

Kate Bowditch, Chair

cc: Senator Edward Kennedy
Senator John Kerry
Congressman Barney Frank
Congressman Stephen Lynch
Congressman Michael Capuano
Secretary Ellen Roy Herzfelder
Mayor Thomas Menino
Boston City Council
Brookline Board of Selectmen

Letter 25

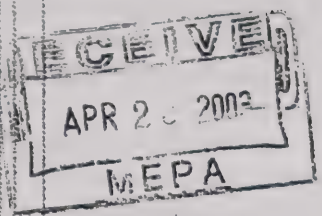
THE EMERALD NECKLACE Conservancy

Brookline Place, Brookline, MA 02445 • 617-232-5374 • Fax 617-232-8151 • www.emeraldnecklace.org

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Stanley
Tudisco
Van Orman
Vizza
Wilson
Zaitzovsky

April 23, 2003



Ms. Ellen Roy Herzfelder, Secretary
MA Executive Office of Environmental Affairs
251 Causeway Street
Boston, MA 02114
ATTN: MEPA Unit

RE: EOFA #11865 - Phase I Muddy River Flood Control, Water Quality, Habitat
Enhancement and Historic Preservation Project FEIR

Dear Secretary Herzfelder:

On behalf of the Emerald Necklace Conservancy (ENC) and our over 450 members, I am writing to express our support for the Muddy River Restoration Project as proposed by the project's proponents, as well as the hope that this project will move forward expeditiously with your approval of the Final Environmental Impact Report. Since 1998, our organization has been actively working to ensure the start-up and success of the Project by:

- undertaking early studies of Muddy River flooding issues;
- bringing together public, private, institutional and community representatives – including over twenty-five Necklace-related civic groups and organizations – in support of the renewal of the landscape, waterparks, parkways and structures of this historic park system;
- working with representatives of the Commonwealth of Massachusetts, City of Boston, Town of Brookline and our community-based parks partners to move the Project forward;
- working with our local and national elected and appointed officials to ensure Project funding in addition to meetings and communications with the U.S. Army Corps of Engineers;
- sponsoring numerous public meetings about the project and its status; and,
- participating on the three project-related citizen and technical committees, among other activities.

We are excited to see the progress that has been made over the past five years, and are committed to keeping up the same vigilance and spirit of cooperation that will lead to the successful completion of the Muddy River Restoration Project. Spurred by the Muddy River Restoration Project, the Conservancy has undertaken a strategic planning process to further define our role in the restoration and long-term maintenance of this historic resource, as well as to identify goals and priorities regarding management of the six-park system. The comments below reflect these deliberations as well as our commitment to the Necklace's renewal and on-going stewardship.

Management

The ultimate purpose of the management structure for the Emerald Necklace, including the Muddy River, should be: comprehensive, consistent, high quality management of the parks as a unified system, transcending jurisdictional boundaries. Included within this goal should be the following objectives:

The park system should be perceived by users as a seamless natural landscape, without jurisdictional differences.

1. A safe and comfortable environment for the public should be ensured throughout the system and through all seasons.
2. Baseline maintenance and restoration should be provided by the public entities, who remain the owners of the land. We should aim for reliable public funding sources/funding stream.
3. Performance-based quality standards should guide all maintenance and restoration.
4. The historic and naturalistic landscapes should be cared for by workers with the expertise necessary to meet unified quality standards.
5. The protection and upkeep of restorative investments should be ensured over time.
6. The management structure for the Emerald Necklace should enable the raising of significant private support and resources to supplement public sector investment. The Conservancy will take the lead in private fundraising.
7. The management structure must be effective in guiding the Muddy River Restoration Project to a successful completion, while strategically managing maintenance and other improvements across the Necklace, and this needs to be sustained over the long term.

The following assumptions are behind our recommendations for the park system's management:

- The ENC will work to supplement and extend the capabilities of the public sector without replacing its responsibility for baseline maintenance and funding.
- The ENC is motivated by its mission: "to protect, restore, maintain and promote the landscape, waterways and parkways of the Emerald Necklace park system as special places for people to visit and enjoy." We recognize the historic nature of this unique and precious landscape and want to restore and preserve it for all time.
- The ENC uses the Emerald Necklace Master Plans as our guide for parks restoration and maintenance, and is a facilitative leader in the master planning process.
- The many entities (public, private and non-profit) which comprise the ENC are vital to a flourishing park system; we welcome and complement their localized stewardship. We have been and will continue to be consensus builders by always seeing the parts in relation to the whole park system.

After an extensive strategic planning process with input from the multiple organizations and perspectives which comprise the Conservancy, our organization recommends the formation of a strong public-private partnership as the future management structure for the Emerald Necklace. As private sector partner, the Conservancy would build a partnership with the City of Boston, the Town of Brookline, and the Commonwealth of Massachusetts for the purpose of managing the Emerald Necklace as a unified park system, governed by a Cooperation Agreement (MOU) signed by the four parties. This mirrors similar partnerships which have been established nationwide to manage, restore and maintain Olmsted-designed landscapes and which was selected after our study of these models as well as local initiatives.

The ENC proposes to play the following key roles in the management structure:

- **Convener and Facilitator** of the parties to the Cooperation Agreement in order to:
 - Develop yearly plans for restoration and maintenance;
 - Identify priority projects;
 - Establish and monitor maintenance and other standards; and,
 - Implement reviews of agreed-upon plans and projects.
- **Provider of resources**, including financial resources, in-kind contributions and volunteers, in support of special restoration, maintenance and programming.
- **Coordinator of consensus-building** with Emerald Necklace constituents and related organizations.
- **Participant in the public process**, through conscientious membership on the publicly-convened and appointed Muddy River Restoration Project Citizens Advisory Committee, Technical Advisory Committee, and the Muddy River Restoration Project Management and Maintenance Oversight Committee, for example.
- **Advocate**, on behalf of the public, for a well-managed and maintained park system.

25.2

We thank the proponents for offering their insights as part of our strategic planning process and commend them for acknowledging our hoped-for role in Chapter 6 of the FEIR. We are eager and ready to play this larger role and have already taken steps to hire outside counsel to assist us in drawing up the MOU which will guide the partnership and the renewal of the entire six-park system.

We look forward to meeting with the proponents to discuss the contents of the MOU in more detail and want to ensure that it gives the Conservancy a meaningful role in parks management, including restoration and maintenance, while allowing us to remain as an effective advocate for the parks as well as the staffs, budgets and standards needed to care for them over generations. We believe that the MOU should provide for an evaluation process in five years as to how well the management structure is working; and, other management options, including a Joint Powers Act entity, should be considered, if necessary.

25.3

The enthusiasm and competence of the newly constituted MMOC will help to ensure the Muddy River Restoration Project's successful implementation. We invite them to work cooperatively with our organization in ways which will lead to full Project funding, permitting and construction. We also encourage the proponents to include the MMOC's Chair in Muddy River Restoration Project-related meetings. However, as this state-mandated body is constituted as a working/advisory committee rather than as a duly registered for- or not-for-profit organization and has no fiduciary responsibilities, it may not be appropriate for the MMOC Chair to become a formal signatory to an MOA/MOU but rather to have a "seat at the table."

25.4

Maintenance

The FEIR appears to incorporate the important components of maintenance for a restored Muddy River environment, and the approach discussed in the FEIR appears to be sound. As stated in our response to the Project's DEIR, there will be a need for a greater level of focus on, and detail required in, a maintenance work plan once the Muddy River area landscapes have been replanted and the needs for its care are specifically understood.

Much of the FEIR understandably focuses on permitting and water-related issues. There is reference to Monitoring and Maintenance of Historic and Character Defining Features (6.9.4). This aspect of the restored landscape will be a critical one to integrate with baseline maintenance of the site and maintenance that attends to the ecological and environmental needs of the river and its banks.

Olmsted's historic design intent, and how it can be reinforced through care of the landscape, is of central importance to the on-going maintenance of the project area. The definition of preservation maintenance as laid out in the document, *Guide to Developing a Preservation Maintenance Plan for a Historic Landscape*, published by the Olmsted Center for Landscape Preservation of the National Park Service (1998 Revised Edition) is a good reference in this regard (bracketed text added): *The act or process of mitigating wear and deterioration of a historic property without altering [and whenever possible, strengthening] its historic character; including the practice of monitoring change, controlling growth, replacing in-kind [or, with historically sympathetic materials], and minimizing disturbance in the landscape to ensure that features, such as vegetation, paths, walls, [bridges], and other landscape furnishings, are not lost and the character of a place is not compromised.*

In addition, below is a list of activities that serve as a framework for preservation maintenance operations and which should be implemented in relation to the Muddy River Restoration Project:

- Protecting and stabilizing existing landscape features;
- Protecting features from damage;
- Repairing damaged or deteriorated features;
- Maintaining features in their stabilized condition;
- Replacing features with historically and ecologically compatible materials; and,
- Perpetuating historic character by selecting materials that support the historic design intent.

The Conservancy will work to ensure that the proponent's commitment to maintenance is carried out effectively both in the Muddy River project area and for the entire Emerald Necklace park system. We look forward to developing maintenance performance standards, plans for improved parks stewardship both public sector and volunteer, and related activities. To this end, we recently served as convener of the proponents in planning for this year's Muddy River area clean-up and maintenance days; continue to expand our "Volunteers for the Necklace" program, and, over the longer-term, anticipate raising funds for and establishing a maintenance endowment for the Necklace.

Historic Resource

As the Project moves forward, it is important to recognize that construction and other work is being undertaken in a landscape listed on the National Register of Historic Places. We have said from the beginning that the Muddy River Restoration Project is more than a flood mitigation project -- it is the renewal of waterparks, and green and open spaces of national significance. Therefore, all Project plans, construction, plantings, mitigation, maintenance and related activities must recognize and respond to this special designation as well as the Necklace's local landmark status.

Related to this Historic Resource discussion, we ask that current and on-going Town of Brookline deliberations on the restoration of the Charlton Street Footbridge (note: the Conservancy has gone on record as supporting bridge restoration) not hold up the issuance of state approval of the Muddy River Restoration Project and state approval of the FEIR. The Conservancy will continue to advocate

for the restoration of the bridge and understands that any proposals by the Town to remove or relocate the bridge will require a "Notice of Project Change" as well as the involvement and approval of the Massachusetts Historical Commission. We believe that the requirement for the "Notice of Project Change" allows the Commonwealth the ability to protect this historic resource should the Town act in a way inconsistent with the *Emerald Necklace Master Plan*.

Engineering

The proponents have done extensive and professional work on project engineering and construction-related issues. We would, however, make the following suggestions for further consideration as the project moves forward:

-A budget should be prepared for all mitigation items identified in Table 10-1 and many other places. The purpose is to attempt to control these costs as the various agencies issue order of conditions with each permit. If the conditions cause the budgets to be exceeded, an appeal could be made for less stringent requirements.

-The project should provide that construction professionals perform a constructability review at various stages of design. This includes pricing the project as if they were bidding the project. The purpose is to provide as "clean" a set of bidding documents as possible. This should help the contractors provide sound bids and to reduce the number of change orders.

-As stated in our response to the Project's DEIR, truck routes need to be further refined; for example, trucks bound for the MassPike Westbound should use the ramp at Newbury Street and not have to go all the way to the Expressway to get to Westbound MassPike.

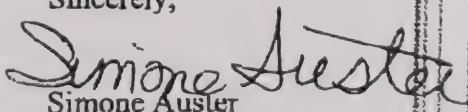
-A significant amount of plantings are scheduled (some \$10 million), and the proponents need to ensure that these plantings will be available when they are required for installation.

-The staging of the work is really extended which may add to cost escalations. For example, surface work cannot start until all the dredging is done, as the staging areas are required for the dredging. There may be sections that could be constructed while the dredging is on-going.

Conclusion

The Emerald Necklace Conservancy is committed -- through its Board of Directors, Stewardship Council, volunteers, supporters and staff -- to ensuring the success of the Muddy River Restoration Project. We applaud the work done, to date, by the Project's proponents at the Charlesgate/Commonwealth Avenue section which has already improved the waterway in this area. We look forward to the continued renewal of the Muddy River and the Emerald Necklace -- a special environmental, cultural and historic resource of great value to economy and quality of life of the Commonwealth, the City of Boston and the Town of Brookline.

Sincerely,


Simone Ausler
President



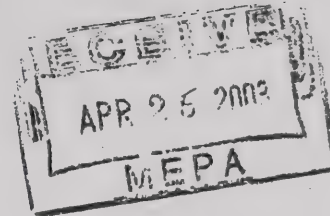
JP Youth Soccer
225 Lamartine St.
Jamaica Plain, Ma. 02130
524-0173

letter 26

AP

April 24, 2003

Ellen Roy Herzfelder, Secretary
Executive Office of Environmental Affairs
Attn: MEPA Office
EOEA#11865
MEPA Analyst Arthur Pugsley
251 Causeway Street
Boston, MA 02114



Dear Ms. Herzfelder,

As president of a youth soccer league that relies on Daisy Field in the fall of each year to play its full-sided games, I am writing to express my concerns about Phase 1 of the proposed Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project. I am specifically interested in the proposed use of the northerly of the two baseball diamonds on Daisy Field as a staging area for the dredging of Leverett Pond, and the proposed reorientation of the diamond upon completion of the project.

Jamaica Plain Youth Soccer serves 450 children aged 6-18 years old each spring and fall. As is true in most parts of the City of Boston, there is a shortage of fields both for baseball and soccer, but specifically full-sided soccer fields. Due to heavy useage of English High School (our home field) by school teams in the fall, we rely on Daisy Field to play our games and to practice. To not have this field available for even one fall season would truly compromise our ability to safely provide field space for our teams to practice and play. I strongly urge you to reconsider the use of the former MDC Kelly Skating Rink site, approximately 200 yards north, as the staging area. Project planners, in the Draft Environmental Impact Report dated December, 2001 rejected that site rather than risk possibly disturbing an historic pool containing rare three-spine stickleback fish. Given the dire consequences for our youth sports program (and others that use Daisy field), I suggest it would be

26-1

advisable to ask the engineers planning this project to revisit the notion of using the Kelly Rink site, and use all available technology to avoid disturbing the surrounding environment.

On behalf of the players, coaches, and organizers of Jamaica Plain Youth Soccer, thank you for considering our concerns as you plan this important major project.

Yours truly,

Donna Cohen
President, JP Youth Soccer



Letter 27
AP

The Commonwealth of Massachusetts
William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

RECEIVED

MAY 2 - 2003

MEPA

April 24, 2003

Secretary Ellen Herzfelder
EOEA
251 Causeway Street, 9th Floor
Boston, MA 02114-2150

Attn: Arthur Pugsley, MEPA Unit

RE: Muddy River Flood Control Project, Boston and Brookline, MHC# 9170; EOEA# 11865

Dear Secretary Herzfelder:

The Massachusetts Historical Commission has reviewed the Final Environmental Impact Report (FEIR) concerning the proposed project referenced above. As you are aware, the Muddy River and its historic landscape is listed in the State and National Registers of Historic Places as part of the Olmsted Park System.

MHC has previously commented that the proposed project will include a significant amount of rehabilitation of the historic landscape along the Muddy river in tandem with the flood control objectives of the project. As stated before, dredging and bank stabilization have been carefully planned to take into account the historic planting plans and original characteristics of the Muddy River. However, MHC previously requested information concerning several aspects of the project and would like to reiterate that request.

Specifically, while the FEIR contains information about certain culverts and headwalls as referenced in MHC's April 8, 2002 comment letter, the MHC had requested in this letter more detailed drawings, plans and technical information concerning the culverts. MHC requests this information again along with specific construction dates of the original culverts and headwalls. The MHC requests this information because these aspects of the projects may constitute an adverse effect (36 CFR 800.5(a)(i)) on historic properties. Although cascade aeration structures are not proposed as a preferred alternative in the project design, MHC still wishes to convey concern for any consideration of the use of these structures by the proponents or the Army Corps of Engineers. These structures may in fact constitute an adverse effect (36 CFR 800.5(a)(2)(v)) on the character of the Muddy River and the Olmsted Park depending on their size, location, and function.

27-1

MHC previously commented that the FEIR should include a more detailed analysis for the proposed maintenance plan in order to protect the substantial public investment in the project. The FEIR begins to detail the implementation of BMP maintenance and have developed a park maintenance plan. MHC understands that a pilot study for BMP implementation and maintenance is under way. MHC requests information concerning this aspect of the project as it develops, as certain construction aspects may have effects on historic properties. Additionally, MHC acknowledges the importance of the Muddy River Restoration Project Maintenance and Management Oversight Committee in the implementation of successful overall, long-term maintenance of the project.

27-2

MHC is also extremely concerned about the status of planning for the Carlton Street Footbridge. As you know, the Carlton Street Footbridge is located within the Muddy River district of the Olmsted Parks System. The Carlton Street Footbridge was designed by Brookline's first town engineer, Alexis French, who collaborated with Olmsted in the design of the Riverway, among other projects. This important bridge

27-3

220 Morrissey Boulevard, Boston, Massachusetts 02125

(617) 727-8470 • Fax: (617) 727-5128

www.state.ma.us/sec/mhc

provides access between Brookline's historic Longwood/Cottage Farm neighborhoods and the Riverway Park section of the Emerald Necklace.

MHC is concerned that planning for the Carlton Street Footbridge is proceeding at the local level in advance of the specific planning for the project's overall commitment to the rehabilitation of bridges and small buildings along with the implementation of traffic circulation improvements, all of which is proposed as Phase III of the project. The bridge is scheduled to be discussed at the 2003 Town Meeting, and it is critical that local planning efforts take into account the recommendations of the Emerald Necklace Parks Master Plan for the rehabilitation of this significant bridge as well as the commitments of the project for Phase III, and MHC requests that the Town involve MHC in the planning efforts that appear to be already underway. Treatment other than rehabilitation of the bridge is inconsistent with the Master Plan and Phase III of the project and MHC is concerned that the filing of a Notice of Project Change may not provide an adequate timeframe for substantive consultation concerning the bridge's treatment. MHC is willing to work with the Town in order to provide technical assistance in consideration of alternatives for the bridge. For example, accessibility for persons with disabilities appears to be an issue in the reuse of the bridge and MHC is willing to meet with the Town and the Massachusetts Architectural Access Board to explore available alternatives that would make the bridge accessible as part of a rehabilitation. MHC has also previously encouraged the Town to explore potential funding sources for the preservation and rehabilitation of the footbridge—such as an historic preservation grant available through the TEA-21 transportation enhancement program through the Federal Highway Administration and the Massachusetts Highway Department. In sum, MHC reiterates its request of April 12, 2002, that further documentation and proposed plans be submitted to the MHC as early in the planning stages as possible so that all alternatives for its treatment may be considered.

Sincerely,



Cara H. Metz
Executive Director
State Historic Preservation Officer
Massachusetts Historical Commission

xc: Marc Paiva, United States Army Corps of Engineers
Muddy River Restoration Project Maintenance and Management Oversight Committee
Boston Landmarks Commission
Brookline Preservation Commission
Boston Parks and Recreation Department

27-3
cont.



Massachusetts Bay Transportation Authority

Mitt Romney
Governor

Kerry Healey
Lt. Governor

Daniel A. Grabauskas
Secretary and MBTA Chairman

Michael H. Mulhern
General Manager

AP

April 24, 2003

Mr. Arthur Pugsley
MEPA Analyst
Executive Office of Environmental Affairs
Causeway St., Room
Boston, MA

Reference: **FEIR for EOE A 11865**
Phase 1 Muddy River Flood Control,
Water Quality and Habitat Enhancement,
and Historic Preservation Project,
Boston and Brookline.

RECEIVED

APR 25 2003

MEPA

Dear Mr. Pugsley:

Provided below is a general comment on the FEIR for EOE A 1185. Our comment pertains to the planned use of portions of the Fenway roadway by Urban Ring BRT vehicles, and some minor modifications to intersections along that roadway in the segment between Brookline Avenue and Louis Prang Street in Boston.

The Urban Ring Phase 2 BRT service being planned in this portion of the corridor has defined and is evaluating the following roadway features along the Fenway between Brookline Avenue and Louis Prang:

- Create a bus-only lane eastbound on Fenway from Pasteur to Huntington Avenue by eliminating on street parking in that area.
- Provide a westbound contra-flow bus lane along the Fenway from Avenue Louis Pasteur to the jughandle at Brookline Ave.
- Modify the jughandle to enable buses to enter it from the contra-flow bus lane.
- Modify the traffic island and provide a traffic signal at corner of Pasteur/Fenway.

We believe that at this time none of the proposed changes along this segment of the Fenway will have significant impacts on the Muddy River Preservation Project. As you know, full evaluation of the environmental impacts of the Urban Ring Phase 2 are the subject of a DEIR currently underway in accordance with EOE A Certificate #12565 scheduled for completion later this year. You may contact me at 617-222-3366 if you require further information.

Sincerely,

Peter C. Calcaterra
Project Manager, MBTA

Cc: Dennis A. DiZoglio, MBTA
Joe Cosgrove, MBTA
Jay Doyle, Earth Tech, Inc.

Boston Redevelopment Authority

Boston's Planning & Economic
Development Office

Thomas M. Menino, Mayor
Clarence J. Jones, Chairman
Mark Maloney, Director

One City Hall Square
Boston, MA 02201-1007
Tel 617-722-4300
Fax 617-248-1937

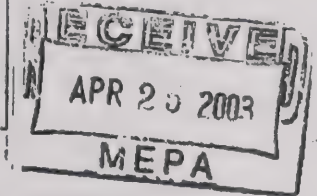
Letter 29

Ellen Roy Herzfelder, Secretary
Executive Office of Environmental Affairs
251 Causeway Street, 9th Floor
Boston, MA 02114-2150

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APR 25 2003

EXECUTIVE OFFICE OF
ENVIRONMENTAL AFFAIRS



Attention: MEPA Unit

RE: EOEA #11835 – Phase I Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project/Final Environmental Impact Report

Dear Secretary Herzfelder:

Pursuant to regulations implementing M.G.L., Chapter 30, Sections 62-62H, the Boston Redevelopment Authority (BRA) submits the following comments with regard to the above-referenced Final Environmental Impact Report (Final EIR).

The proposed project, which comprises Phase I of the 1999 **Emerald Necklace Environmental Improvements Master Plan**, involves a multidisciplinary approach to improving the Muddy River system, adjacent parkland, and associated areas that are part of the Emerald Necklace parkland, located in Boston and Brookline, and extending from the Charles River to Ward's Pond. The project is designed to meet five specific objectives:

- Provide flood control
- Improve water quality
- Enhance aquatic and riparian habitat
- Institute Best Management Practices in the Muddy River system
- Restore landscape and historic resources

In order to accomplish these objectives, a number of improvement activities are proposed, including:

- Dredging and removal of accumulated sediments from the Muddy River and from Leverett, Willow, and Ward's Ponds to improve flood carrying capacities.
- Infrastructure improvements, including culvert replacements/daylighting and some improvements to roadway storm drainage systems.
- Removal of invasive species (such as Phragmites) and restoration of a more diverse plant community along the banks of the river and the park.

- Regrading and stabilization of river and park banks to preserve the historic bank configuration and rehabilitation of the historic islands.
- Restoration of existing degraded wetlands and establishment of replication or replacement wetlands in selected upland areas.
- Plant vegetation in keeping with Olmsted's historic landscape design.
- Implementation of watershed-wide Best Management Practices with the goal of reducing solids loading in the Muddy River by 30 percent by the year 2006.

Implementation of this Phase I restoration/improvement project will require nearly \$100 million from Federal, State, local, and private sources. (Although the State and local (Boston and Brookline) parties have committed their portion of funding to this project, the Federal participation, through the U.S. Army Corps of Engineers, has yet to be approved.) To ensure that this significant investment is protected for the future, a management and maintenance plan has been developed. The proposed management model is a Public/Private Partnership with Boston, Brookline, and the Metropolitan District Commission (MDC) as the public entities and the Emerald Necklace Conservancy as the private sector partner. In addition, an Environmental Improvements Committee will be established to serve as an independent oversight body for the project, at the request of the Secretary of Environmental Affairs. Further, annual updates on the progress of project implementation, monitoring and effectiveness of mitigation and replanting will be required to be filed with the NEPA office for all phases of this project.

The Final EIR has provided additional information and details regarding several elements of the proposed project, including, *inter alia*, dredging and sediment management, wetland and water quality impacts and mitigation, Best Management Practices, management structure and maintenance plan, historic resources, and rare species habitat evaluation, in response to the Certificate on the Draft Environmental Impact Report and review comments. In general, we find that the Final EIR has adequately responded to our concerns and comments expressed in our comment letter. We are pleased with the decision that prior to dredging, fish and other aquatic life, including reptiles and amphibians, will be collected using electro-shock equipment and will be relocated temporarily outside the work zones. We recommend that this mitigation condition also be included in Table 10-1 of the Section 61 Finding, under "Fish and Benthic Resources". However, it is unclear whether relocation efforts also will occur during the winter hibernation season. As a further mitigation, we would also recommend that winter dredging be scheduled to avoid those locations where hibernation is likely to occur, as determined by the wildlife biologist.

The proposed management structure for the Phase I Muddy River project is a Public/Private Partnership which includes the MDC. However, there is a proposal under discussion at the State level which would eliminate the MDC and replace its functions with the Department of Environmental Management (DEM) and perhaps others. If this were to occur, presumably

the DEM would become part of this Partnership as successor to the MDC. This would need to be spelled out in the Memorandum of Agreement setting up the Partnership

29-3
cont.

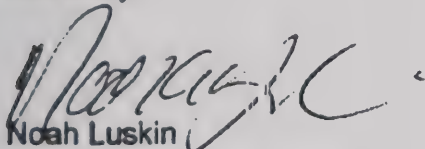
A second concern is the availability of funding for this project, considering the budget crisis facing the State and municipalities. While all parties have made commitments of their intention to supply the necessary funding, actual appropriations for the full project are yet to be made (except for the Charlesgate element of the project, which received approval to proceed prior to submission of the Final EIR and is underway). Therefore, it is vital that the highest priority be given to appropriating the necessary funds to implement this long-awaited project.

In addition, the project proponents need to be aware of future potential improvements to the traffic circulation at Sears Circle. Although there are as yet no definitive plans for redesign or reconstruction, several alternatives have been under study by the City and others. The proposed Phase I project includes the construction of new culverts under the Liverway and Brookline Avenue, as well as improvements to the roadway storm drain system. These improvements will need to be coordinated as much as possible with the future roadway changes to avoid any conflicts or the need for costly changes in the future.

29-4

The Phase I Muddy River project will provide for the long-awaited restoration of the Muddy River and the Emerald Necklace parkland, providing sorely-needed flood control improvements, the removal of contaminated sediments and invasive species, the enhancement of wildlife habitat, the improvement of water quality, and the restoration of the historic aesthetic and landscape character of this valuable resource. The BRP fully supports this most important project and looks forward to its expeditious implementation.

Sincerely,



Noah Luskin
Senior Project Manager

NL/ps

cc: Toni Pollak
Acting Commissioner
Boston Parks and Recreation Department

MERTENS02/MR-FloodControl.doc

April 25, 2003

Ellen Roy Herzfelder, Secretary
Executive Office of Environmental Affairs
251 Causeway Street, Suite 900
Boston, MA 02114
Attention: Arthur Pugsley, MEPA Office

Re: Phase I Muddy River Flood Control, Water Quality and Habitat Enhancement, and
Historic Preservation Final Environmental Impact Report
EOEA #11865

Dear Secretary Herzfelder:

The City of Boston has reviewed the Final Environmental Impact Report (FEIR) and hereby submits comments.

Changes proposed since the filing of the Draft Environmental Impact Report (DEIR) include:

- a new Memorandum of Agreement (MOA), replacing the 1999 MOA, that will add the Metropolitan District Commission (MDC) as a party and incorporate further commitments regarding the funding of capital costs and maintenance by all proponents and funding agencies;
- modified operations due to the potential that cobbles and boulders in the river will preclude use of the auger hydraulic dredge and required mechanical dredging;
- an option to over-dredge in some areas, allowing cobbles and boulders to remain in place. This method can be used only if the required river depth can be achieved; and
- new proposed sites for the installation of structural Best Management Practices (BMPs) such as particle separators, dry swales, bioretention and underground sand filters. These additional BMPs will be necessary to achieve a 75 cubic yard (CY) reduction in sediment to meet the overall goal of a 30 percent reduction in solids to the Muddy River.

The Boston Environment Department, including the Boston Landmarks Commission (BLC) and Boston Conservation Commission (BCC), strongly endorse the Emerald Necklace Master Plan and the proposed restoration project. We continue to view the collaborative planning and restoration processes as a unique and powerful commitment by the City of Boston, Town of Brookline, MDC and residents to reinforce Olmsted's social and environmental urban vision.

The FEIR does not fully respond to this department's request in DEIR comments that pervious paving materials be considered for new and reconstructed sidewalks. The response is that sidewalk materials are subject to a standards agreement between

proponents, standards that are not now alike. No method for a discussion of this issue is identified. } 30-1

The FEIR does not respond to our DEIR comment that, due to the nature of the project, truck routes should be inspected daily and vacuum sweeping employed on City streets and MDC roadways if dredge spoils and other project-related materials have been left behind. We reiterate this request. } 30-2

We request the vibration-prevention plan to be developed by the contractor be supplied to this department, as vibration-related complaints are filed with this office. Because noise complaints are also filed with this office, we once again ask that the Boston Air Pollution Control Commission (APCC) be notified when permits are sought from the Inspectional Services Department (ISD) for work outside of standard hours. The APCC can be reached at 617-635-3850. } 30-3
} 30-4

The BCC concurs with the proponent that it may issue an Order of Conditions for most of the work as a limited project in accordance with 310 CMR 10.53(4) as it presents a comprehensive opportunity to enhance the natural capacity of the Muddy River to protect the interests of the Massachusetts Wetlands Protection Act, specifically flood control, storm damage prevention, prevention of pollution, protection of fisheries, and protection of wildlife habitat. The BCC endorses the project in its entirety (including the proposed maintenance plan, construction mitigation, and best management practices) and emphasizes the importance of the complete removal of *Phragmites* from the project area, as this is paramount to enhance the flood capacity of the river and to remove its seed source to prevent future proliferation of this nuisance vegetation. Furthermore, the BCC supports the use of in-stream sedimentation basins, as they offer the best opportunity to preserve the historic character of the riverbanks and to reduce the potential need for dredging of the river in its entirety. The BCC requests that the proponent and the Department of Environmental Protection ("DEP") work with it and the Brookline Conservation Commission to prepare Notices of Intent for the project in such a manner that will enable the conservation commissions to retain permitting through Orders of Conditions for the greatest extent of proposed activities and over the greatest geographical extent of the project as possible. Furthermore, should variances from the DEP commissioner be necessary for portions of the project, the BCC requests that it have the opportunity to offer construction-phase and perpetual maintenance conditions on how such activities would proceed through the variance procedures established in 310 CMR 10.05. } 30-5
} 30-6

The Boston Landmarks Commission (BLC) supports the goal of historic preservation of the Muddy River project and the actions to support that goal listed in section 7.1 of the FEIR. The BLC recognizes that the FEIR precedes much of the design development phase of the project. We look forward to working with the Boston Parks and Recreation Department (BPRD), other project proponents and their consultants, as we have in the past, to review design development for this part of the Olmsted park system, a designated Boston Landmark. We appreciate the strong commitment of the proponents to the historic preservation of the Olmsted parks, one of the Boston region's greatest legacies.

Although the cascade system is not proposed as the preferred alternative, the BLC would like to reiterate its opposition to such structures as well as to other new, above-ground structures that may be proposed to the Muddy River project. We particularly look forward to reviewing culvert and headwall designs. The BLC is also concerned with the review of BMP development } 30-7
} 30-8

that may affect design. Finally we are looking forward to reviewing the plans for laydown areas, dredging techniques and other construction phase activities.

} 30-8
cont.

While we understand the need to articulate best practices and management structures, it is not realistic to expect government agencies to commit funds and make financial decisions at this time.

Thank you for the opportunity to comment. We look forward to further progress on this important project.

Sincerely,

Bryan Glascock
Acting Director

cc: Andrea d'Amato, Chief of Environmental Services

Not listed on Certificate

Letter 31

AP



BROOKLINE VILLAGE ACTION GROUPS

P.O. BOX 723

Brookline Village, MA 02147

April 23, 2003



Secretary Of Environmental Affairs
251 Causeway Street
Boston, MA 02114

RECEIVED

APR 29 2003

Ref: EOEA No. 11865

MEPA

PUBLIC COMMENT

Subject: FINAL ENVIRONMENTAL IMPACT REPORT
MUDDY RIVER PROJECT

Proponents: City of Boston/ Town of Brookline

Contrary to popular folk lore the flooding of the MBTA rails along the Green Line in 1996 and 1998 , was not caused by an overflow of the Muddy Rivers open waters...

The "River" is a part of the Charles Basin (a lagoon)with the surface waters held at a constant vertical level by the 1978 Dam at Love Joy Street Boston, designed for "flood control" by the Army Corps Of Engineers and operated by the MDC.

The Proponents have failed to detail exactly where the Muddy River overflowed Its' present floodplain containment and explain the origin of storm waters that supercharged the sewer and drain systems and were the real cause of damages.] 31-1

The Proponents omit and ignore the real Historical Value of the River in colonial times and start with the failed 'flushing' of the Fens as proposed by the landscape designer Olmstead, in the late 1800's.] 31-2

The history of Muddy River is well noted in Governor Winthrop's time, as a source of fresh water for the Colony at Boston and as provision for sailing ships.
A reservoir was in place behind the earthen berm (Brookline Ave.) and casks of water were carted to Sewall's Point for loading to sailships anchored in the tidal basin. In 1637 Mr. Craft and his partners operated the First Grist Mill driven by river flow in the new world settlement. The Mill was at site of what has in more recent years been known as the Sears Lot , (Mill Dam Road, now Brookline Avenue). Early maps show a broad salt water canal was excavated to service the Mill and cargo ships moored at Sewall's Point ,moving goods to and from barges floated in the shallows of Back Bay

In recent history the Muddy River Wetlands were found to be the epicenter of the West Nile Virus , particularly at Willow Pond and Leverett Pond

The migrating waterfowl have been purposefully fenced from the bankside grazing and nesting areas on the Brookline side of Leverett Pond. Said fencing also impedes turtle reproduction.

Grasslands are trimmed short while water edge loosestrife and other weeds abound . Majestic old trees planted over 100 years ago are cut down ..and stumped. Sodium chloride , sand and oils reach the river waters with each storm..

Parking lots and buried fuel tanks have been installed in the floodplain and buffer zone.

Flood walls and Dikes are in need of repair..and there is no HP access to the T from the park at "Longwood" stop or bus stop at Aspinwall Ave, on Brookline Avenue... } 31-3

Only one of four brook to river outfalls has an in line oil separating system. } 31-4

The plan has no improved public safety practices. Past history shows we cannot rely on BMPs } 31-5

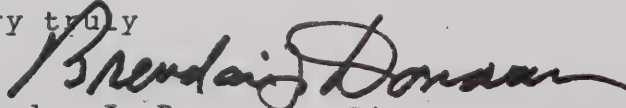
The plan offers no new storm water retention features or dry season flushes..no water quality improvement or wildlife habitat enhancements. } 31-6

The Olmsted Plan was negated with the building of the Charles River Dam in 1912.. and cannot be restored. } 31-7

Unfortunately the project offered is merely cosmetic and will not prevent or control flooding as averred.

Thank you for the opportunity to comment.

Very truly



Brendan J. Donovan , Director
BVAG

B

Appendix B

APPENDIX B

**SUPPLEMENTAL FINAL EIR
DISTRIBUTION LIST**

SFEIR CIRCULATION LIST

FEDERAL AGENCIES

Sen. Edward M. Kennedy
US Senator
2400 JFK Federal Building
Boston MA 02203

Sen. John Kerry
US Senator
One Bowdoin Square, Tenth Floor
Boston MA 02114

Congressman Barney Frank
29 Craft Street, Suite 375
Newton MA 02458

Dorothy Reichard
Congressman Frank's Office
29 Craft Street
Newton MA 02458

Congressman Stephen Lynch
Joseph Moakley Federal Courthouse
One Courthouse Way, Suite 3110
Boston MA 02210

Congressman Capuano
110 First Street
Cambridge MA 02141

Kate Auspitz
Office of Congressman Capuano
110 First Street
Cambridge MA 02141

John Kennelley
US Army Corps of Engineers
696 Virginia Road
Concord MA 01742

Michael Keegan
US Army Corps of Engineers
696 Virginia Road
Concord MA 01742

David Webster
US Environmental Protection Agency
JF Kennedy Building
Boston MA 02203

Edward Reiner
US Environmental Protection Agency
JF Kennedy Building
Boston MA 02203

Eric Hutchins
National Marine Fisheries
One Blackburn Drive
Gloucester MA 01930

Phillip Morrisson
US Fish & Wildlife Service
70 Commercial, Suite 300
Concord NH 03301

Myra Harrison/Robert Page
US National Parks Service
Frederick Law Olmsted Historic Site
99 Warren Street
Brookline MA 02445

Peter Weiskel
US Geological Service
10 Bear Foot Rd.
Northborough MA 01532

Jeffrey A. Bean, Regional Director
Federal Emergency Management Agency, Region I
McCormack Post Office & Courthouse Building
Boston MA 02109

G. Fred Vanderschmidt
Federal Emergency Management Agency, Region I
McCormack Post Office & Courthouse Building, Room 442
Boston MA 02109

Karen Malfy
US Dept. of Housing and Urban Development
OCPD
10 Causeway
Tip O'Neil Building
Boston MA 02202

STATE AGENCIES

Ellen Roy Herzfelder (3 Copies)
Secretary of Environmental Affairs
Attention: MEPA Office
EOEA No. 11865
100 Cambridge Street
Boston MA 02114

Betsy Shure Gross
Executive Office of Environmental Affairs
251 Causeway Street, Suite 900
Boston MA 02114

Sara Cohen
Charles River Team Leader
Executive Office of Environmental Affairs
251 Causeway Street, Suite 900
Boston MA 02114

Commissioner Kathy Abbott
Department of Conservation and Recreation
251 Causeway Street
Boston MA 02114

Julia O'Brien, Chief Planner
Department of Conservation and Recreation
251 Causeway Street
Boston MA 02114

Don Guidoboni, Permits
Department of Conservation and Recreation
251 Causeway Street
Boston MA 02114

* Commented on FEIR

Richard Thibedeau
Department of Conservation and Recreation
251 Causeway Street
Boston MA 02114

Nancy Thornton, Director
Div. of Resource Cons. Waterways
Department of Conservation and Recreation
349 Lincoln Street, Bldg. 45
Hingham MA 02043

Jack Lash
Department of Conservation and Recreation
Bldg. 3701, 131 Barnum Road
Devens MA 01432

Patrice Kish
Department of Conservation and Recreation
251 Causeway Street, Suite 600-700
Boston MA 02114

Lorraine M. DellaPorta, Esq.
Mass. Office of Dispute Resolution
100 Morrissey Blvd
McCormack Building, Room 627
Boston MA 02125

Tim Smith
Wetlands Restoration & Banking Program
EOEA
One Winter Street
Boston MA 02108

*Brona Simon, DSHPO
Massachusetts Historical Commission
220 Morrissey Blvd.
Boston MA 02125

Steven Lipman
Department of Environmental Protection
One Winter Street, 6th Floor
Boston MA 02108

*John Felix, Deputy Regional Director

* Commented on FEIR

Department of Environmental Protection
One Winter Street Boston, MA 02108

David Slagle
Department of Environmental Protection
One Winter Street
Boston MA 02108

Yvonne Unger
Water Quality Certification
Department of Environmental Protection
One Winter Street
Boston MA 02108

Sharon Pelosi
Chapter 91 Program
MA DEP
One Winter Street
Boston MA 02108

Cris McCombs, Director
Massachusetts Emergency Management Agency
400 Worcester Road
Framingham MA 01702

Richard Keller, Aquatic Biologist
Massachusetts Division of Fisheries & Wildlife
One Rabbit Hill Road
Westborough MA 01581

*Patricia Huckery
Natural Heritage & Endangered Species Program
Massachusetts Division of Fisheries & Wildlife
Field Headquarters, One Rabbit Hill Road
Westborough MA 01581

Cindy Delpapa, Stream Ecologist
Massachusetts Riverways Programs
251 Causeway Street
Boston MA 02114

Paul J. Diodati, Director
Division of Marine Fisheries
251 Causeway Street, Suite 400
Boston MA 02114

MEPA Coordinator

Division of Marine Fisheries
251 Causeway Street
Boston MA 02114

Anne Livingston, Urban Rivers Coordinator
Massachusetts Riverways Programs
251 Causeway Street
Boston MA 02114

Project Review Manager
Coastal Zone Management
251 Causeway Street
Boston MA 02114

*Marianne Connelly
MWRA
100 First Avenue
Charlestown MA 02129

Toni Coyne-Hall
Mass. Dept. of Housing & Comm. Development
One Congress Street, 10th floor
Boston MA 02186

Martin Pillsbury
Metropolitan Area Planning Council
60 Temple Place
Boston MA 02111

Todd Fontanella
Executive Office of Transportation & Construction
10 Park Plaza
Boston MA 02116

Jeffrey Senterman
Massachusetts Aeronautics Commission
10 Park Plaza, Room 6620
Boston MA 02116

Greg Prendergast
Massachusetts Highway Department
10 Park Plaza
Boston MA 02116

*Peter Calcaterra
Massachusetts Bay Transportation Authority
10 Park Plaza

* Commented on FEIR

Boston MA 02116

Kenneth Beloverac, P.E.
Manager of Design, Track and Structure
Massachusetts Bay Transportation Authority
500 Arborway
Jamaica Plain MA 02130

William Tuttle
Dep. Dir. Planning
Massachusetts Turnpike Authority
10 Park Plaza
Boston MA 02116

George Furst
Massachusetts Turnpike Authority
668 South Avenue
Weston MA

Jacquelyn I. Wilkins
Aviation Planner
MassPort
One Harborside Drive
E. Boston MA 02128

Tom Ennis
MassPort
1 Harborside Drive
East Boston MA 02128

Lt. James Considine
State Police
250 Leverett Street
Boston MA 02114

Senator Robert Travaglini
Senate President
State House
Boston MA 02133

Sen. Byron Rushing
State Senator
State Senate, Room 544
State House
Boston MA 02133

Senator Steven Tolman

State House, Room 213-A
Boston MA 02133

Senator Dianne Wilkerson
State House, Room 312-C
Boston MA 02133

Sen. Cynthia Creem
State Senator
State House, Room 416B
Boston MA 02133

Rep. Salvatore Dimasi
Speaker of the House of Representatives
State House
Boston MA 02133

Rep. Gloria L. Fox
State Representative
House of Representatives, Room 167
State House
Boston MA 02133

Representative David Donnelly
State House, Room 136
Boston MA 02133

Representative Brian Golden
State House, Room 473-B
Boston MA 02133

Representative John Hart Jr.
State House, Room 172
Boston MA 02133

Representative Kevin Honan
State House, Room 185
Boston MA 02133

Representative Frank Israel Smizik
State House, Room 33
Boston MA 02133

Representative Elizabeth Malia
State House
Boston MA 02133

Ann McGahan
CPPS
10 Park Plaza, Suite 2150
Boston MA 02116

LOCAL OFFICIALS

Hon. Thomas Menino, Mayor
Boston City Hall
Boston MA 02201

Michael Galvin
Chief of Basic City Services
One City Hall Plaza
Boston MA 02201

Antonia Pollak, Commissioner
Boston Parks & Recreation Department
1010 Massachusetts Avenue
Boston MA 02118

Stanley Ivan
Chief Engineer
Boston Parks & Recreation Department
1010 Massachusetts Avenue
Boston MA 02118

Margaret Dyson
Director of Historic Parks
Boston Parks & Recreation Department
1010 Massachusetts Avenue
Boston MA 02118

Virginia Mayer
City of Boston-Washington, DC Office
1660 L Street NW, Suite 1050
Washington DC 20036

Note: 4 Members of Boston Environment Department will share one set of documents, per their written request:

Maura Zlody
MEPA Reviewer
Boston Environment Department
One City Hall Plaza, Rm. 805
Boston MA 02201

* Commented on FEIR

*Bryan Glascock, Acting Director
Boston Environment Department
One City Hall Plaza, Rm. 805
Boston MA 02201

Chris Busch
Conservation Commission
Boston Environment Department
One City Hall Plaza, Rm. 805
Boston MA 02201

Ellen Lipsey
Boston Environment Department
Landmarks Commission
One City Hall Plaza, Rm. 805
Boston MA 02201

Vineet Gupta
Boston Transportation Department
One City Hall Plaza
Boston MA 02201

Richard Loring
Boston Transportation Department
One City Hall Plaza
Boston MA 02201

Adam Shulman
Boston Transportation Department
One City Hall Plaza, Rm. 721
Boston MA 02201

Joseph Casazza, Commissioner
Boston Public Works Department
One City Hall Plaza
Boston MA 02201

Vincent G. Mannering, Executive Director
Boston Water & Sewer Commission
980 Harrison Avenue
Boston MA 02119

John P. Sullivan, Jr., PE
Chief Engineer
Boston Water & Sewer Commission
980 Harrison Avenue

* Commented on FEIR

Boston MA 02119

Amy Schofield
Boston Water & Sewer Commission
980 Harrison Avenue
Boston MA 02119

*Noah Luskin
Boston Redevelopment Authority
One City Hall Plaza
Boston MA 02201

Richard B. Mertens, AICP
Environmental Review Officer
Boston Redevelopment Authority
One City Hall Plaza
Boston MA 02201

Rosario Salerno
City Clerk
One City Hall Plaza
Boston MA 02201

Paul A. Christian, Commissioner
Chief of Department
Boston Fire Department Headquarters
115 Southampton Street
Boston MA 02118

Sergeant Paul Flaherty
Boston Police Department Area D
One City Hall Plaza, 5th Floor
Boston MA 02201

P. O. John Harden
Boston Police Department
1165 Blue Hill Avenue
Dorchester MA 02124

Jalal Ghaemghami
Boston Public Health Commission
1010 Massachusetts Avenue
Boston MA 02118

Richard Serino
Chief of Department
Boston Emergency Medical Services

* Commented on FEIR

767 Albany Street
Boston MA

Charles Yancey
City Council
City Hall
Boston MA 02201

Michael Ross
City Council
City Hall, 5th Floor
Boston MA 02201

Marta Rivera
Office of Councilor Ross
City Council
City Hall
Boston MA 02201

Charles Turner
City Councilor
City Council
City Hall
Boston MA 02201

Maura Hennigan
City Councilor
City Council
City Hall
Boston MA 02201

Rob Consalvo
City Councilor
City Council
City Hall
Boston MA 02201

Jerry P. McDermott
City Councilor
City Council
City Hall
Boston MA 02201

Felix D. Arroyo
City Councilor
City Council
City Hall

* Commented on FEIR

Boston MA 02201

James M. Kelly
City Councilor
City Council
City Hall
Boston MA 02201

John Tobin
City Councilor
City Council
City Hall
Boston MA 02201

Maureen E. Feeney
City Councilor
City Council
City Hall
Boston MA 02201

Michael Flaherty
City Councilor
City Council
City Hall
Boston MA 02201

Paul J. Scapicchio
City Councilor
City Council
City Hall
Boston MA 02201

Stephen J. Murphy
City Councilor
City Council
City Hall
Boston MA 02201

Robert Allen, Chair
Board of Selectmen
333 Washington Street
Brookline MA 02445

Members of the Brookline Board of Selectmen
Robert Allen, Chair
Gil Hoy
Joseph Geller

* Commented on FEIR

Michael Sher
Michael Merrill
333 Washington Street
Brookline MA 02445

Richard Kelliher
Town Administrator
333 Washington Street
Brookline MA 02445

*Tom DeMaio
Commissioner
Brookline Dept. of Public Works
333 Washington Street
Brookline MA 02445

Peter Ditto
Brookline Dept. of Public Works
333 Washington Street
Brookline MA 02445

Erin Chute
Director of Parks & Open Space
333 Washington Street
Brookline MA 02445

Jerome Kampler, Chairman
Brookline Planning Board
Brookline Town Hall
333 Washington Street
Brookline MA 02245

Patrick Maloney, Chief Inspector
Brookline Department of Health
11 Pierce Street
Brookline MA 02245

Ann Blair
Town of Brookline
333 Washington Street
Brookline MA 02445

Greer Hardwicke
Brookline Preservation Commission
333 Washington Street
Brookline MA 02445

* Commented on FEIR

Chairman
*Brookline Conservation Commission
333 Washington Street
Brookline MA 02445

Tom Brady, Administrator
Brookline Conservation Commission
333 Washington Street
Brookline MA 02445

Additional copies

c/o Tom Brady
Administrator
Brookline Conservation Commission
333 Washington Street
Brookline MA 02445

Captain Peter Scott
Brookline Police Department
350 Washington Street
Boston MA 02445

Robert Rooney, Commissioner
Newton Public Works Dept.
1000 Commonwealth Avenue
Newton Centre MA 02459

***CITIZENS ADVISORY COMMITTEE**
(received copies on or before 1/04/05)

Charles Alan Birnbaum, FASLA
National Park Service
1849 C Street N. W. (NC-320)
Washington DC 20040

*Isabella M. Callanan
Friends of the Muddy River
22 Bowker Street
Brookline MA 02445

Suzanne Comtois
66 Queensbury Street, #319
Boston MA 02115

Christine Cooper
Jamaica Pond Project
104 Childs Street
Jamaica Plain MA 02130

Edward B. Cutler, Ph.D.
14 Monmouth Court
Brookline MA 02446

Jim Igoe
Historic Massachusetts, Inc.
45 School Street
Boston MA 02108

Frances Allou Gershwin
Burns & Levinson
125 Summer Street
Boston, MA 02110

Edward Burke
151 Park Drive #35
Boston MA 02215

Alan Goodman, Vice President
The Abbey Group
575 Boylston Street
Boston MA 02116

George Hagerty
646 Central Street
Stoughton MA 02072

John Leahy
156 I Street
South Boston MA 02127

Arleyn A. Levee
51 Stella Road
Belmont MA 02478

Arlene Mattison
209 Pond Avenue
Brookline MA 02445

Hugh Mattison
209 Pond Avenue
Brookline MA 02445

* Commented on FEIR

Kelly Brilliant
Fenway Alliance
337A Huntington Avenue
Boston MA 02115

George Proakis
P.O. Box 230600
Boston MA 02123-0600

Marion Sabal
390 Commonwealth Avenue, #411
Boston MA 02215

Fredericka Veikley
Fenway Civic Association
231 Park Drive #31
Boston MA 02215

Tina Oddleifson, Executive Director
Brookline GreenSpace Alliance
40 Webster Place
Brookline MA 02445

Kate Bowditch
99 High Street
Brookline, MA 02446

Margaret Van Deusen
Charles River Watershed Association
48 Woerd Avenue
Waltham 02453

Katherine Mathew
Boston GreenSpace Alliance
36 Bromfield Street
Boston, MA 02108

Lauren Meier, ASLA
National Park Service,
Olmsted Ctr.
240 Beaver Street
Waltham, MA 02452

Loraine M. Della Porta
MA Office of Dispute Resolution
100 Morrissey Blvd.

McCormack Bldg - Rm 627
Boston, MA 02125

OTHERS

*Simone Auster, Executive Director
Emerald Necklace Conservancy
2 Brookline Place
Brookline MA 02445

Jack Malone
Northeastern University
Cullinane Hall
288 St Botolph Street
Boston MA 02115

Peter Bowne Executive Director
Boston GreenSpace Alliance
36 Bromfield Street
Boston MA 02108

Irene V. Gillis
Restore Olmsted's Waterway
163 Kent Street
Brookline MA 02446

William Fowler
Mass. Historic Society
1154 Boylston Street
Boston MA 02215

*Brendan J. Donovan, Director
Brookline Village Action Groups
P. O. Box 723
Brookline Village MA 02147

Pauline R. Katz
55A St. Paul Street
Brookline MA 02446

* Commented on FEIR

Jan Henderson
*MASCO
375 Longwood Avenue
Boston MA 02215-5328

Sr. Ann M. Donovan, SND
Emmanuel College
400 The Fenway
Boston MA 02215

John Businger, Chairman
Muddy River Action Group
33 St. Paul Street
Brookline MA 02446

Dermard K. Ransil, MD
226 Calumet Street
Boston MA 02120

Myrna Putziger
Rubin and Rudman LLP
50 Rowes Warf
Boston MA 02110-3319

David W. Scudder
Vice President
Wellington Management Co.
75 State Street
Boston MA 02109

Dr. Charles Steinberg
Executive Vice President/Public Affairs
Boston Red Sox
4 Yawkey Way
Boston MA 02215-3496

Robin Vranicar
27 Alexander Street
Framingham MA 01702

Eugenie Beal
40 Joy Street #3
Boston MA 02114

Claire Flury
95 Park Drive #1
Boston MA 02215

* Commented on FEIR

Ron Lyberger
25 Euston Street #2
Brookline MA 02446

Gina Crandall
117 Stedman Street
Brookline MA 02446

Edward Bell
Riverside Properties, Inc.
1 Washington Street, Suite 300
Wellesley MA 02481

Brenda Lew
Friends of the Muddy River
107 Queensbury Street
Boston MA 02215

Robert R. McCoy
23 Countryside Drive
Mattapan MA 02126

Stephen T. Kunian
One International Pl., 18th Floor
Boston MA 02110

Michael Dukakis
88 Perry Street
Brookline MA 02446

David A. Wahlstrom
Wentworth Institute of Technology
550 Huntington Avenue
Boston MA 02115

Fred Perry
32 Bowker Street
Brookline MA 02445

John R. Elwood
305 County Road
Bourne MA 02532

Roger Frymire
22 Fairmont Avenue
Cambridge MA 02139-4423

Gordon J. Collins
483 Boylston Street
Brookline MA 02445

Matthew J. Kiefer
Goulston C Storrs
400 Atlantic Avenue
Boston MA 02110

M. Robert Barstow
401 Commonwealth Avenue
Boston MA 02215

Charles Button
92 Vermont Street
West Roxbury MA 02132

Kate Geist
551 Brookline Avenue #4
Brookline MA 02445

Dr. Stanley A. Rumbaugh
Wheelock College
200 The Riverway
Boston MA 02215

Janice Miller
14 Roseland Street
Dorchester MA 02124

Mark Lisle
17 Park Vale #4
Brookline MA 02446

Alison Pultinas
81 Lawn Street
Roxbury MA 02120

Robert L. Coleman
Coleman & Sons
249 Smith Street
Waltham MA 02451

Dr. Gulshan Saini
24 Brook Street
Brookline MA 02445-6914

Frances G. Beatty, Chair
Dept. of Landscape Architecture
University of Arkansas
230 Memorial Hall
Fayetteville AR 72701

Paul Mentag
71 Dugway Road
PO Box 322
Brownfield ME 04010

Lin Cheney Sasman, JPNC
27 Starr Lane
Boston MA 02130

Robert B. Canterbury
Audubon Circle Neighborhood Association
12 Aberdeen Street
Boston MA 02215

Stephen Clark
109 Westchester Road
Jamaica Plain MA 02130

Richard K. Domas
Hoyle, Tanner & Assoc., Inc.
45 Bromfield Street
Boston MA 02108

John Furlong
Radcliffe Institute
6 Ash Street
Cambridge MA 02138

Bentrice Nessen
ICON Architecture, Inc.
38 Chauncy
Boston MA 02111

Jean Stringham
233 Mason Terrace
Brookline MA 02446

Frank Farlow
8 Bowker Street
Brookline MA 02445

David Tuteim
16 Westgate Drive, #105
Woburn MA 01801

Jan Peretz
FCDC
72 Peterborough Street
Boston MA 02215

John A. Martin
48 Bradley Road
North Weymouth MA 02191

Dom D'Eramo
Rizzo Associates
One Grant Street
Framingham MA 01701-9005

Johanna Mendillo
The Boston Harbor Associates
374 Congress Street, #609
Boston MA 02210

Jeffery Ferris
Emerald Necklace Greenway Project
51 Sedgewick Street
Jamaica Plain MA 02130

Thomas B. Kennedy
Sovereign Bank
46 Glen Road
Brookline MA 02445

Lisa Tucker-Kellogg
12 Monmouth Court
Brookline MA 02446

Frances Shedd-Fisher
149 Walnut Street
Brookline MA 02445

George Hagerty
Fenway Studios, Inc.
30 Ipswich Street
Boston MA 02115

Bike Boston's Emerald Necklace Greenway Project
P.O. Box 743
Boston MA 02130

John S. Stanley
Deputy Director for Operations
Museum of Fine Arts
465 Huntington Avenue
Boston MA 02115-5597

John M. Ferrell, President
YMCA of Greater Boston
316 Huntington Avenue
Boston MA 02115-5019

Daniel Steiner, President
New England Conservatory
290 Huntington Avenue
Boston MA 02115

Paul Riccardi
Dean for Admin & Operations
Harvard School of Public Health
677 Huntington Avenue
Boston MA 02115

Katherine Sloan, President
Mass College of Art
621 Huntington Avenue
Boston MA 02115

Charles E. Beveridge
Series Editor
The Frederick Law Olmsted Papers
American University
4400 Massachusetts Avenue NW
Washington DC 20016

Lee Albright
282 Newton Street
Brookline MA 02146

*Sarah Freeman and Sam Sherwood
22 The Arborway
Jamaica Plain MA 02130

Joan Fried
36 Armory Street
Brookline MA 02146

Jean Morgan
Franklin Park Coalition
12 Dabney Street
Roxbury MA 02119

James Norcott
25 Glen Road
Brookline MA 02146

Dick Garver
23 Monmouth Court
Brookline MA 02446

Sara Nesson
8 Lansing Rd.
West Newton MA 02465

Bran Ben Joseph
Dept. of Urban Studies & Planning
MIT
77 Massachusetts Avenue, 10-485
Cambridge MA 02139

Pamela Goodman
*Brookline Greenspace Alliance
40 Webster Place
Brookline MA 02146

Susan Parks
Boston Preservation Alliance
45 School Street
Boston MA 02108

Ronald S. Gray
5 Wingwam Street
North Brookfield MA 01535

Molly Paul
Brookline Community Fund
40 Webster Place
Brookline MA 02445

Dan Bowden
Berklee College
36 Bowker Street
Brookline MA 02446

Pitt, Hubbard and Marshall
201 Devonshire Street
Boston MA 02110
Attn: Heidi

Anne Hawley
Gardner Museum
2 Palace Road
Boston MA 02115

* Commented on FEIR

Bruce Boyer
Wentworth Institute
550 Huntington Avenue
Boston MA 02115

Richard Heath
42 Bourne Street
Boston MA 02130

Jim Brown
97 Franklin Street
Stamford CT 06902

Ruth Hennig
4 Linden Court
Brookline MA 02146

John Heinstad
Wentworth Institute
550 Huntington Avenue
Boston MA 02215

B. Andrew Campion
122 Riverway #8
Boston MA 02215

John Iapini
12 Dane Street
Jamaica Plain MA 02130

Gerry Wright
Jamaica Park Advisory Group
36 Perkins Street
Jamaica Plain MA 02130

Aric Kabillio
Americorps/Water Watch
29 Temple Place
Boston MA 02111

David Riley
150 Aspinwall Avenue
Brookline MA 02446

Frank Keefe
The Keefe Company
27 School Street
Boston MA 02108

Christine Porchilo
Boston Preservation Alliance
45 School Street
Boston MA 02118

Joseph Cordell
Fenway Garden Society
86 Jersey Street
Boston MA 02108

John Kelly
66 The Fenway #22
Boston MA 02115

Dr. Robert Cook
Arnold Arboretum
125 The Arborway
Jamaica Plain MA 02130

Carl Koechlin
Fenway CDC

* Commented on FEIR

73 Hemenway Street
Boston MA 02115

Stanley Rumtage
Wheelock College
200 The Riverway
Boston MA 02215

April Cottini
2600 Hillegas Avenue, #1
Berkeley CA 94704-3334

Margaret Kenney
44 Washington Street #116
Brookline MA 02146

Prof. David E. Langseth, Sc.D., P.E.
Dept. of Civil & Environmental Engineering
Northeastern University
360 Huntington Avenue
Boston MA 02115

Paul Foster
938 Metropolitan Avenue
Hyde Park MA 02136

Vivian Li
TBHA
374 Congress Street, Suite 609
Boston MA 02210

Joan LeBlanc
The Boston Harbor Associates
374 Congress Street
Suite 609
Boston MA 02210

Gregory Selkoe
Jamaica Hills Association
166 Moss Hill Road
Jamaica Plain MA 02130

Wilbur & Maria Cove
75 St. Alphonsus Street #407
Boston MA 02120

John Lewis

* Commented on FEIR

97 Newbury Street
Boston MA 02116

Helen Cox
11 Park Drive #22
Boston MA 02215

Karen Wepsic
Federation for Public Transportation
84 Prince Street
Jamaica Plain MA 02130

Lawrence Shubow Esq.
22 Crescent Road
Mashpee MA 02649-4312

John Shea
26 Brook Street
Brookline MA 02445

Josephine DeMarco
99 Kent Street #7 418
Brookline MA 02146

Bertha DeLeon
60 High Street
Brookline MA 02146

Nancy Searholes
1 Field Rd.
Lexington MA 02421-8014

Lauren Dewey Platt
41 Park Drive
Boston MA 02215

Susan M. Mackey
Wheelock College
200 The Riverway
Boston MA 02215

Jennifer Maiola
The Back Bay Courant
PO Box 1248
Boston MA 02117

Mindy Lubber

* Commented on FEIR

199 Babcock Street
Brookline MA 02146

Neil Lucey
5 Fuller Street
Brookline MA 02146

Hooker Talcott
420 Warren Street
Brookline MA

Leo Entwistle
3 Payson Road
Chestnut Hill MA 02467

Ray Foley
77 West Milton Street
Hyde Park MA 02136

David Epstein
The Abbey Group
575 Boylston Street
Boston MA 02116

Jeanne McHallam
10 Richwood Street
West Roxbury MA 02132

T. Meyer
Sasaki Associates
64 Pleasant Street
Watertown MA 02472

Jane Walker Pfister
31 Linden Street
Brookline MA 02445

Peter M. Bryant, CFO
Gardner Museum
2 Palace Road
Boston MA 02215

Michael Merrigan
Starbucks Coffee Company
One Charles Street
Boston MA 02114

Sam Bass Warner, Jr.
15 Cottage Street
Cambridge MA 02139

Christopher Vanriper
214 Chesnut Street
Brookline MA 02445

Liz Vieza
The Halvorson Company
161 Massachusetts Avenue
Boston MA 02115

Fred Perry, President
Brookline GreenSpace Alliance
40 Webster Place
Brookline MA 02445

Richard Freeland, President
Northeastern University
110 Churchill Hall
Boston MA 02115

David R. Hornfischer
Vice President for Admin and Finance
Berklee College of Music
1140 Boylston Street
Boston MA 02215-3693

*BROOKLINE TOWN MEETING MEMBERS - PRECINCT 1
(for whom addresses are available - no addresses for Loretta Slover, Tom Higgins,
Russell Evans)

Peter Ames
90 Ivy Street
Brookline MA 02446

Steven Kanes
89 Carlton Street
Brookline MA 02446

Frederick Lebow
71 Colchester Street
Brookline MA 02446

*John Schemmer
33 Euston Street

* Commented on FEIR

Brookline MA 02446

Susan Williams
35 Prescott Street
Brookline MA 02446

Michael Robbins
105 Colchester Street
Brookline MA 02446

Pamela Zelnick
5 Carlton Street
Brookline MA 02446

S. Parkman Shaw
19 Colchester Street
Brookline MA 02446

Melvin Clouse
59 Monmouth Street
Brookline MA 02446

Karen Lieff
22 Carlton Street
Brookline MA 02446

REPOSITORY COPIES

Boston Parks & Recreation Department
Attn: Margaret Dyson
1010 Massachusetts Avenue, 3rd Floor
Boston, MA 02118

Boston Environment Department
Attn: Ellen Lipsey
Boston City Hall, Room 805
One City Hall Plaza
Boston, MA 02215

Boston Public Library
Attn: Government Documents
Copley Square Branch
700 Boylston Street
Boston, MA 02116

Brookline Department of Public Works

* Commented on FEIR

Attn: Tom Brady
Brookline Town Hall, 4th Floor
333 Washington Street
Brookline, MA 02445

-The Emerald Necklace Conservancy
Attn: Simone Auster
Two Brookline Place
Brookline, MA 02445

Frederick Law Olmsted National Historic Site
Attn: Mark Swartz
National Park Service
99 Warren Street
Brookline, MA 02445

MASCO
Attn: Jan Henderson
375 Longwood Avenue
Boston, MA 02215

Massachusetts Historic Society
Attn: Peter Drummey or William Fowler
1154 Boylston Street
Boston, MA 02215

Jamaica Plain Branch Library
Attn: Alice Roberts
12 Sedwick Street
Jamaica Plain, MA 02130

Brookline Public Library
Attn: Librarian
361 Washington Street
Brookline, MA 02445

Additional FEIR Commenters (not included on above list):

*Adaptive Environments
374 Congress Street, Suite 301
Boston, MA 02210

*Cathleen Cavell
Friends of the Carlton Street Footbridge
27 Monmouth Court
Brookline, MA 02446

* Commented on FEIR

*John Bain, Chair
Brookline Park and Recreation Commission
652 Hammond Street
Chestnut Hill, MA 02467

*Michael Frank, President
Jamaica Plain Regan Youth League
P.O. Box 2418
Jamaica Plain, MA 02130

*Donna Cohen, President
Jamaica Plain Youth Soccer
Jamaica Plain, MA 02130

* Commented on FEIR

C

Appendix C

APPENDIX C

STORMWATER MANAGEMENT AND MAINTENANCE PLAN

Appendix C

Stormwater Management and Maintenance Plan

C.1 Introduction

Maintenance of the storm drainage system as well as the BMPs is required to ensure that the target sediment reduction goal is attained and water quality in the Muddy River is improved. Table C-1, at the end of this section, presents a summary of the maintenance plan for storm drains, source control BMPs, treatment control BMPs and other activities.

Estimated staffing for new maintenance events are provided as a starting allowance. Many of the maintenance activities are already covered (AC) in department budgets although they are difficult to breakout of the larger budget. Proponents will work toward identifying individual budget allowances in future budgeting cycles that can be reported in the annual update report as benchmarks.

C.2 Management of Stormwater Maintenance

C.2.1 Responsible Parties

Management of the stormwater facilities contributing to the Muddy River will involve several jurisdictions and public entities. The drainage area for the stormwater facilities is split between Boston (approximately 1,100 acres), Brookline (approximately 2,300 acres) and the Department of Recreation and Conservation (DCR) (approximately 35 acres). Within the Boston jurisdiction, Boston Water and Sewer Commission is responsible for maintaining the storm drains, the Public Works Department provides street sweeping, and the Transportation Department maintains the roadways. Similarly in Brookline, the Water and Sewer Division of the Department of Public Works maintains the storm drain system, the Highway and the Sanitation Division provides street sweeping. All maintenance for the DCR areas is provided by their maintenance division. The Massachusetts Highway Department maintains a portion of Route 9 through Brookline, the Massachusetts Turnpike Authority maintains the Mass Pike where it crosses the Muddy River in Charlesgate and the Massachusetts Bay Transportation Authority maintains the subway and trolley system in the watershed where some storm runoff contributes to the Muddy River.

The agencies implementing maintenance in the Muddy River will necessarily be coordinating their activities with the overall Muddy River management organization as shown on Figure C-1.

City of Boston
 Town of Brookline
 Division of Recreation and Conservation
 Emerald Necklace Conservancy
 Maintenance and Management Oversight Committee

Advisory Group
 Citizens Advisory Committee
 Technical Advisory Committee

Regulatory Group
 MEPA
 Army Corps of Engineers
 EOE
 Permitting Agencies

Parkland Maintenance

Boston Parks and Recreation

General Superintendents for Horticulture and Trades

Parkman Crews and Trade

Brookline Parks and Open Space

Operations Manager
 Trash Collection
 Forestry
 Trades

Olmsted & Riverway Crews with Specialized Skill Maintenance

DCR

Maintenance Division

Best Management Practices

Boston Public Works
 Boston Water and Sewer Commission
 Boston Transportation Department

Brookline Public Works

Highway & Sanitation
 Water & Sewer
 Parks & Open Space
 Engineering & Sanitation

DCR

MBTA

MHD

Funding and Reporting

The responsibility for funding, enforcement, and monitoring of maintenance program for the stormwater facilities including BMPs rests with the project proponents. The Memorandum of Understanding (MOU) and the Memorandum of Agreement will outline the organizational commitments and the maintenance responsibilities including funding among all parties. The MOU and MOA delineates the responsibilities of the signing parties to implement and fund BMPs, including ongoing maintenance. The document provides an enforceable agreement to meet these obligations. Parties to the MOU have proposed their actions in the SFEIR and that will be the basis for delineating responsibilities.

The purpose of the Annual Update is to inform the Secretary and the public on the process of project implementation and monitoring, as well as the effectiveness of the maintenance program. The annual update to MEPA is a crucial element of the BMP plan because it provides a method of reporting the implementation progress and effectiveness of the plan to all parties of the MOU.

The major components of the BMP plan that will be addressed in the Annual Update to MEPA include results of water quality sampling program (sampled quarterly-reported annually); results of catch basin cleaning program (Brookline, Boston and DCR, annually); and a general report addressing new BMPs that were implemented within the year and a measure of effectiveness.

C.2.2 Emergency Action Plan

The Emergency Action Plan to prevent and reduce potential flooding in the Muddy River is included here since it is the first management step in dealing with runoff from storms. This plan should be coupled with the actions for inspection of certain drainage facilities as described below.

A major emergency action plan was developed through cooperation of numerous entities to prevent potential flooding of the Muddy River. The Interim Interagency Plan outlines the steps taken by the MDC (now DCR), the City of Boston, the Town of Brookline, and the MBTA to prevent flooding of the River in the vicinity of the MBTA Green line. As flood improvement facilities are constructed as part of this project, the level of flooding and back-up issues are expected to be reduced. This plan should be modified once these facilities are completed and experience with new storms shows a new level of maintenance/operational needs. The current plan includes four stages, as outlined in the following paragraphs.

Stage One: The Alert

National Weather Service (NWS) locates a storm that poses a potential flood threat to Southern New England.

Metropolitan District Commission Charles River Dam (now DCR) institutes "Standard Operating Procedures for Hurricanes and Storms" (1977).

Boston Parks & Recreation (BPR), Boston Water & Sewer Commission (BWSC) and Brookline Water & Sewer (BRKWS) notify personnel to be on alert for possible staffing, and they monitor NWS advisories.

The Mass Bay Transportation Authority (MBTA) shall institute "Standard Operating Procedure: Muddy River Flood Control (1997) (SOP).

BPRD checks water level in Jamaica Pond, and closes baffles between Jamaica Pond and Wards Pond.

Stage Two: The Warning

NWS forecasts heavy rainfall to occur within six hours in the Boston area and issues a Severe Storm Warning.

MDC (DCR) begins 24 hour staffing.

BWSC staffs up, opens the gate at the Brookline Ave. Gatehouse to allow the Muddy River to follow its natural course through the Back Bay Fens and through the Muddy River Diversion Conduit under Brookline Avenue.

MBTA dispatches crew to monitor water levels in the Riverway at the culverts, and is prepared to install drop-log dams.

Stage Three: The Operation

One inch of rain has fallen within 3 hours and heavy rain is forecast to continue.

MDC (DCR) continues to monitor rainfall and maintain river levels according to their SOP.

BWSC dispatches crane to the culverts.

Pooling in the Riverway begins, with water level reaching 110' MDCB (10' BCB or 4.45 NGVD).

BWSC crane removes trash grates over culverts.

MBTA suspends trains on "D" line, and installs both drop-log dams.

BRKWS dispatches crew to Brookline Avenue field to monitor access chamber covers to Tannery Brook Drain for movement, indicating surcharge possibility.

Flood water on the tracks. Preparation ends, the battle is joined.

Stage Four: Cessation of Event

NWS advises that the storm has passed. Operations continue until flood threat is over and water levels recede.

This plan also includes an Emergency Notification Form which lists the agencies involved in the Action Plan and the appropriate contact individuals in each agency.

C.3 Storm Drainage System Maintenance

C.3.1 Catch Basin Maintenance

C.3.1.1 Cleaning

Current maintenance practices for catch basin cleaning in the Town of Brookline (Town) include inspection and cleaning of major roadway basins twice a year and local side street basins once a year. The Department of Public Works (DPW) Water/Sewer Division conducts catch basin cleaning operations. Maintenance of Route 9 (Boylston Street) is controlled by Massachusetts Highway Department and is not part of Town DPW operations. During inspection and cleaning of Town catch basins, information regarding condition of structure and amount of material removed are recorded onto a standard form. Information recorded on the forms is entered into a database to track material recovered and areas cleaned. The database is also used to assess whether additional cleanings are required in certain areas around Brookline. Catch basins have been incorporated into a Geographic Information System (GIS) to serve as a tool to locate and plan cleaning events.

Catch basin cleaning is conducted April 1st through December 1st. One clamshell type crane truck with operator conducts cleanings five days a week. Daily cleanings are conducted between 5 am and 1 pm. The Town also owns and operates two vactor type catch basin cleaning trucks. The vactor trucks are used whenever possible, but are limited to certain locations because of their size. Catch basins are cleaned on main streets from 5:00 am to 7:30 am and on side streets from 7:30 am to 1:00 pm. Catch basin cleaning routes are divided into seven areas within the Town. Cleaning routes are also designated on a GIS map. Catch basin cleanings are transported to the Town's Transfer Station, weighed, and then unloaded at the Town's temporary storage yard located at 815 Newton Street. Catch basin cleanings are unloaded at the storage yard two or three times a day. When enough catch basin cleaning material has accumulated at the storage yard, a private contractor loads and transports the material to an approved facility. Brookline will continually update its database with the condition of the catch basins, which will help develop a regular catch basin cleaning program.

Future practices for Brookline are expected to be cleaning and inspection on major roadways twice per year and local streets once per year. This practice will be continued until the data base shows that some other frequency can be implemented based on geographical areas or rate of deposition that continues to maintain adequate capacity in the catch basins to effectively remove sediments.

With the new catch basin cleaning program, BWSC will have a more comprehensive database including information such as location, structural integrity, and sediment deposition rate of each catch basin. This will streamline the cleaning and maintenance processes and enables crews to clean catch basins as part of a regularly scheduled

program. An important component of Boston's new catch basin database is updating it by documenting when catch basins are paved-over, added, repaired, and cleaned.

BWSC is completing their identification and cleaning program with a monitoring program to determine the optimum cleaning frequencies. At the end of this program, BWSC will determine the most cost effective cleaning frequency and provide agency resources on an annual basis to meet the recommended program.

The DCR will create a catch basin database and a regular cleaning program. The DCR will reconstruct portions of their stormwater drainage system. Once construction is complete; inspection, monitoring, and frequent maintenance will minimize future reconstruction.

C.3.1.2 Labeling

Catch basin labeling is currently being conducted by BWSC and Brookline for catch basins that are rehabilitated or on new catch basins. The DCR should adopt similar regulations for "Don't Dump" signs at catch basins receiving rehabilitation or new catch basins.

C.3.2 Storm Drain, Outlet Structure, River and Culvert Inspection and Maintenance

Inspection and maintenance of the various drainage facilities needs to be conducted to be sure the facilities are operating at full capacity to reduce flooding in the drainage area. This section identifies procedures inspection and maintenance of storm drains, the outlet structures and also the culverts and infrastructure within the river.

C.3.2.1 Preventative, Corrective and Emergency Actions for Specific Storm Events

This section of the Maintenance Plan contains a description of preventative, corrective, and emergency actions that are to be conducted preceding, during and following a storm event of a specific magnitude.

Responsibility for preventative and corrective measures would be shared by Boston Parks and Recreation Department (BPRD), Brookline Parks and Open Space Division (BPOSD), and the DCR. Each agency would be responsible for river segments within their boundaries and culverts under their roadways. BPRD would report maintenance needs to BWSC and BPOSD to Brookline Department of Public Works.

Preventative Measures

Preventative measures prior to large storms should include staff walking along the River doing visual inspections and removing trees or other debris that are blocking culvert or bridge openings. For example, as a result of large storms in the past, significant erosion has occurred due to blocked drains or catch basins. Preventative measures including visual inspections during large storms could limit this type of erosion in the future.

Corrective Measures

In addition to regular maintenance measures in the Muddy River watershed, specific corrective measures need to be undertaken following storms of expected to exceed 4 inches in 24 hours. These corrective and maintenance measures include removing debris from culverts and bridge openings as well as catch basin and storm drain cleaning. The catch basin cleaning programs currently being implemented by BWSC and the Town of Brookline should include provisions for these measures following storm events. It is very important that catch basins that typically experience backup in large storms are inspected and if necessary cleaned immediately following large storms to remove sediment that has been deposited during the event. In general, catch basins would be expected to operate through storm events and collect debris, however, particularly large events may impact catch basins more than normal storm events and should be checked.

Correction of eroded stream banks and pedestrian trails should also be completed following storms of large magnitude to prevent further erosion. A maintenance form would be completed when correcting eroded banks and trails caused by large storms, based on a routine maintenance and inspection form. Removing debris, including fallen tree branches and litter carried by the storm, is another important corrective measure that must be undertaken by all three entities following large storms.

C.3.2.2 Storm Drain Maintenance

The Town of Brookline's Water/Sewer and Engineering Divisions conduct storm drain inspections. The Engineering Division has three engineers trained to conduct drain inspections who work with one or two Water/Sewer crews to conduct drain inspection work. Typically, storm drain problems occur during the rainy seasons in the fall and spring. Once a problem is observed and documented, procedures to remedy the problem are put in place. The Water and Sewer Division has one truck equipped with a robotic camera to visually inspect storm drain lines that need to be cleaned. Other multi-purpose trucks are available for accessing and cleaning storm drains. Currently, outfalls are visually inspected during dry weather (period of no precipitation for 72 hours) and wet weather conditions. Inspections are conducted to observe the quality, flow, and integrity of the storm drain system. If a non-storm water discharge is observed, the discharge is documented and then addressed using the Town's Illicit and Illegal Discharge Elimination Program.

C.3.2.3 Culvert Maintenance

Existing culverts in the project area are maintained by BWSC, Brookline Public Works Department or the DCR. The proposed project improvements will not change this arrangement and will probably lower maintenance requirements through improved design.

Culvert maintenance consists of two major activities; clearing accumulated debris or sediment and repairs to the structures. In a previous Section preventative inspections prior to major storms are described. Routine inspection should also occur twice per

year outside of specific storms. When blockages are discovered they should be cleared.

One time per year the culverts should be inspected for structural conditions to be sure no cracks, erosion, or settlement has occurred that may compromise the operation of the culvert.

Boston and Brookline is responsible to maintain all culverts in the park area except those under the DCR roadways.

C.3.3 Deepened Channels

Deepened channels, require yearly monitoring for sand bar formation. Channel shapes and depths will be measured at the end of construction. Once per year, a grid will be set up to measure sediment depths at each deepened channel and estimate remaining volume. This activity can be conducted by either Boston or Brookline or contracted to a third party.

When the channel sections refill by more than 50 percent, the proponents would review the need to schedule and permit construction activities to re-dredge those channels if they are continuing to contribute to flooding situations.

C.4 Source Control BMP Maintenance

C.4.1 Street Sweeping

Maintenance of the street sweeping programs is a key component in an effective, long-term BMP program for the Muddy River watershed. Annual budgets must include maintenance costs as well as costs of new street sweeping trucks and equipment. Boston and Brookline will be responsible for their respective streets in the watershed. The DCR will augment their existing street sweeping program and provide sufficient budget to complete this activity.

C.4.1.1 Brookline

The DPW Highway and Sanitation Division conducts street sweeping operations. Currently, the Town owns and operates three street sweepers. Street sweeping activities occur primarily during the evening hours. Streets within the Town's main commercial areas, including Harvard, Washington, Beacon, and adjacent side streets are swept every night. Two of the Town's sweepers are dedicated to these areas. Residential areas in the north end of Town are swept once a week. Streets in south Brookline are swept every ten days. Street sweepers follow the same routes as the curbside trash collection trucks. There are a total of five routes in Brookline. Street Sweeping routes have been incorporated into the Town's GIS. Two out of the three sweepers run at night and one sweeper runs during the day. Street sweeping is conducted seven days a week. Material recovered during sweeping operations is transported to the Town's Transfer Station, weighed, and then unloaded at the Town's temporary storage yard located at 815 Newton Street. When enough street sweepings have accumulated at the storage yard, a private contractor loads and hauls the material to an approved solid waste disposal facility. Street sweeping operations

are temporarily suspended during the winter snow plowing/deicing months. Street sweeping operations resume immediately after the snow removal season in early spring to remove residual salt/sand left on the streets.

The current street sweeping program will continue in Brookline.

C.4.1.2 Boston

The Boston Public Works Department (PWD) conducts street sweeping of the city streets. The PWD has two programs for street sweeping: Posted Street Cleaning and Non-posted Street Cleaning. All non-posted streets are cleaned once a week or more if necessary. The Posted Sweeping Program is separated between a Night Program and a Daily Program. Sweepers also clean streets before and after special events, such as parades, road races and neighborhood festivals.

Boston's Night Sweeping Program includes all of the major city arterial routes. The Daily Sweeping Program typically operates from April 1 through November 30. Each side of a posted street is cleaned once every other week. Parking bans posted on streets serve to educate the public and to have vehicles removed on certain days so sweeping can be thorough. Additional street sweepers may be contracted and city sweepers run more frequently during the fall leaf season. Parked cars and other access impediments can hinder the street sweeping program.

The current street sweeping program will continue in Boston.

C.4.1.3 DCR, MHD, and Newton

The DCR's street sweeping program includes most streets and is typically performed once per week. The MHD performs street sweeping annually in the spring. Newton performs street sweeping once per week.

C.4.2 Illicit and Illegal Discharge Elimination Program

In Brookline, if a non-storm water discharge is observed during a routine drain inspection, the Town immediately proceeds to address the problem using the Illicit and Illegal Discharge Elimination (IIDE) Program. The Town's Engineering and Water/Sewer Divisions administer the program. The Town's IIDE program is designed to locate/remove the source of pollution through investigating manholes, outfalls, dye-testing, TV inspection, and sampling. Most of the historical problems have been cross-connections with sewers, poor controls on construction sites, and dumping waste into catch basins. The Department of Public Works has also instructed the Town's Building Department to notify the Engineering Division if a possible cross-connection exists.

Boston has a similar IIDE program based on identification of illicit and illegal connects and addresses these on an as needed basis. As of 2000, 30 connections were corrected in the Muddy River basin and 3 were being corrected in the 2002 construction year.

C.4.3 Construction Site Runoff Control

The Town of Brookline has included a by-law to regulate and enforce construction site runoff, required erosion and sediment control (ESC) on construction sites, and conducts construction site inspections as part of their Construction Site Runoff Control by-law that was passed at Town Meeting in Spring 2003. A "hotline" for the public to report non-compliant activities is in place. Sites of 2,500 square feet in size or sites that store more than 100 cubic yards of excavate or fill material will require an ESC. DPW/Engineering shall conduct the ESC inspections and plan review.

The Post Construction Runoff Control by-law was passed at Town of Brookline Meeting in Spring 2003. The by-law regulates and enforces post-construction site runoff, requires plan review of new projects to ensure that all designs incorporate sensible storm water management practices, requires operation and maintenance (O&M) plans for all storm water structures and practices, and enforces site inspections to make sure site construction is in accordance with approved plans. Site inspections are conducted by the DPW.

BWSC requires a Drainage Discharge Permit for all non-stormwater discharges to its drainage system, including construction site dewatering, permanent subsurface drainage, non-contact cooling water, non-contact industrial process water, and water associated with hydrological testing, groundwater treatment or remediation, and removal and installation of an underground storage tank. BWSC reviews the permit applications. Retaining stormwater on-site is required whenever site conditions permit as determined by the BWSC. Under the Sewer Use Regulations, anyone seeking to construct, repair, or modify a sewer or storm drain service connection to the system, or to discharge under a Drainage Discharge Permit, may be required to prepare and implement an Erosion and Sediment Control (ESC) Plan. The ESC plan, reviewed by the BWSC, will help to prevent the introduction of sediments into sewers and storm drains.

C.5 Supplemental Activities

C.5.1 Annual Water Quality Sampling Program

During preparation of the Muddy River Environmental Impact Report (EIR), the water quality of the Muddy River was tested during dry and wet weather events. The monitoring resulted in finding exceedances of the DEP Class B Water Quality Criteria for percent oxygen saturation at the Longwood Avenue Bridge (dry weather conditions), pH in the Daisy Field Drain (first wet weather sampling event - October 6, 2000), and fecal coliform and fecal streptococcus coliform bacteria (during each sampling event) at several locations within the Muddy River system. Based on those data a program for long-term monitoring was developed as follows.

An annual water quality sampling program consisting of quarterly (seasonal) sampling events. The sampling will be conducted at the following locations:

<i>Within the Muddy River</i>	<i>Drainage Outfalls</i>
--------------------------------------	---------------------------------

Commonwealth Avenue	Emmanuel College Drain
Agassiz Road	Longwood Avenue Drain
Boston Gate Houses	Tannery Brook Drain
Fens Bridge	Huntington Avenue
Longwood Avenue Bridge	Village Brook Drain
Outlet of Leverett Pond	Daisy Field Drain
Outlet of Willow Pond	Chestnut Street Drain
Outlet of Wards Pond	

The Town of Brookline and the Boston Water and Sewer Commission independently conduct investigations into conditions within the above drainage outfalls to determine potential sources of non-domestic sewage nutrients when conditions indicate the need.

During each quarter, water quality samples will be collected during a dry period (no rainfall in the past 96 hours, may be reduced to 48 hours if necessary during rainy quarters when a sample wasn't able to be collected), during precipitation, and the day following a precipitation event. The rationale behind this frequency of sampling is to obtain seasonal data preceding precipitation (rain or snow), and to monitor the impact to water quality during and after an event. Therefore, in any given year, up to 12 sampling events will occur at each sampling location.

Samples shall be collected and analyzed by a qualified laboratory for the following parameters:

Sample Parameters	
Fecal Coliform Bacteria	Turbidity
Fecal Streptococcus Coliform Bacteria	Alkalinity
Total Suspended Solids (TSS)	Acidity
True and Apparent Color	Ammonia Nitrogen
Total Phosphorus	Nitrate-Nitrite Nitrogen
Orthophosphate Phosphorus	Metals
	TPH-EPH

Field monitoring for pH, temperature and dissolved oxygen will also be conducted during all sampling.

Data from this monitoring program can be used to monitor the water quality as related to meeting DEP Class B waters and also progress towards reducing sediment loads on the basin. These results will be provided in the Annual Update Report. This program is also an excellent candidate for local universities and interest groups to participate as part of educational programs.

The water quality monitoring program will be used to determine in a coordinated manner the overall health of the water system. Several agencies and organizations are

already gathering data for different but similar purposes and if the collection and analysis were coordinated the overall costs could be reduced and quality and usefulness of the data increased. Boston and Brookline would share the cost of the water quality monitoring based on watershed area. The DCR is also expected to share in this cost on the basis of the MOA. There are several other sources of funding that should be investigated such as state agencies, private groups and universities. University study programs can be used for teaching and source of sample collection and analysis that may be useful for the program. Volunteers like the Charles River Watershed Association may also contribute to this effort.

C.5.2 Public Education and Participation

The Town of Brookline conducts the following public education measures: Annual distribution of informational brochures with utility bills; storm water information page on the Town's website; "Infoline" for the public to access for general storm water information; storm water information on the Brookline Access Television (BAT); and posters/videos for schools (grades 8-12). The Town conducts four measures related to public participation component of the SWMP: local advertisements or public service announcements on the BAT; local clean-ups along water resource areas in Brookline; community "hotline"; and the storm drain stenciling program.

C.5.3 Waterfowl Control Program

A good waterfowl control program is a combination of public education (i.e. signs warning pedestrians not to feed the geese) and regulatory actions. The program will be evaluated biannually for its effectiveness. Brookline and Boston have been working with the Massachusetts Society for the Prevention of Cruelty to Animals (MSPCA) Living with Wildlife program to develop a comprehensive approach to goose management. Yearly egg-oiling activities are planned by Brookline and Boston to help control the geese population. New "Please Do Not Feed the Birds" signs have been added to several parks and this effort will be further expanded into the Muddy River watershed.

C.5.4 Household Hazardous Waste Collection

Brookline and Boston both have household hazardous waste collection programs the will continue as part of Best Management Practices. The Town has an effective Household Hazardous Products (HHP) program. Currently, there two days a year set aside for HHP collection advertised in newspapers, flyers and cable. The Town also has 3 locations for oil collection.

Boston also runs two HHP collection days in the spring and fall notifying residents through mail, newspapers and radio. Boston also runs paint and waste oil collection centers in Roxbury, Hyde Park, Brighton, and East Boston one day per month.

C.6 Treatment Control BMP Maintenance

Structural BMPs must be properly maintained to ensure effective sediment removal rates. The maintenance frequency of different types of structural BMPs varies greatly,

depending on the watershed and loading. This is one of the major reasons why data from the particle separator pilot study is important prior to locating and designing any units in the watershed. Likewise, BMPs such as bioretention areas should be installed and monitored prior to implementing other similar structural BMPs in the watershed. This is to ensure that specific types of BMPs are effective and that the entities are able to maintain the BMPs to the maximum extent possible to ensure sediment removal efficiencies.

C.6.1 Particle Separators

The particle separators will be inspected seasonally for the first year of operation to establish an appropriate maintenance schedule. Thereafter, the system will be cleaned twice a year unless the inspection suggests a different cleaning frequency based on sediment buildup. One cleaning event should occur just prior to the winter salting and sanding season. Maintenance will be the responsibility of the owner of the particle separator.

C.6.2 Bioretention Areas

Frequent maintenance to maintain plant health and prevent clogging of the soil pores and the under-drain system is required. Mulch will be added and tree stakes replaced annually. Each month, litter and debris will be removed and the Bioretention areas will be inspected. Pruning, weeding, and reseeding will occur as required.

C.6.3 Vegetated Swales

Maintenance requirements for vegetated swales include regular grass mowing, no shorter than twice the design flow depth (typically 4-6 inches). Swales should also be inspected monthly to check for inlet plugging and signs of erosion. If erosion is occurring, stabilization of eroded side slopes and/or bottom is required. It is also necessary to keep swales free of debris and damaged areas reseeded as soon as possible. Several seasons of planting and re-seeding of sparsely vegetated areas may be needed in order to reach optimum performance (EPA, 1999). Other maintenance requirements for grass swales include de-thatching the swale bottom and removing the thatching, aeration of the swale bottom, and nutrient and pesticide use management. In addition, proper maintenance requires scraping the swale bottoms and removing sediment to restore the original cross-section and infiltration rate every five years. Maintenance will be the responsibility of the landowner.

Table C-1
Maintenance for Muddy River Stormwater Facilities

<i>Maintenance Activity</i>	<i>Brookline</i>		<i>Boston</i>		<i>DCR</i>		<i>Newton</i>		<i>MHD</i>	
	Activity	Estimated Staffing	Activity	Estimated Staffing	Activity	Estimated Staffing	Activity	Estimated Staffing	Activity	Estimated Staffing
<i>Storm Drainage Maintenance</i>										
Catch Basin Inspection and Cleaning	Major roads: inspect and clean twice per year, Local side streets: inspect and clean once per year	AC ¹	Current cleaning frequency of approximately every 3 years to be adjusted based on monitoring program	AC ¹	Inspect and clean once per year	AC ¹	Inspect and clean once or twice per year	AC ¹	Inspect and clean once per year	AC ¹
Catch Basin Labeling	Include as part of catch basin construction / rehabilitation program		Include as part of catch basin construction / rehabilitation program							
Preventative Actions for Specific Storm Events	Inspect MR before storms >4 in / 24 hrs. remove debris and remove debris after storm	6 hrs / yr	Inspect MR before storms >4 in / 24 hrs. remove debris and remove debris after storm	6 hrs / yr	Inspect MR before storms >4 in / 24 hrs. remove debris and remove debris after	6 hrs / yr				
Storm Drain Maintenance	Record drain backups and correct backups after storms		Record drain backups and correct backups after storms		Record drain backups and correct backups after storms					
Culvert Maintenance	Inspect for blockage 2 times per year and inspect for integrity one time per year	32 hrs/yr	Inspect for blockage 2 times per year and inspect for integrity one time per year	32 hrs/yr	Inspect for blockage 2 times per year and inspect for integrity one time per year	32 hrs/yr				
Deepened Channel Maintenance	Measure sediment accumulation once per year	80 hrs / yr ²	Measure sediment accumulation once per year	80 hrs / yr ²	Measure sediment accumulation once per year	80 hrs / yr ²				
<i>Source Control BMP Maintenance</i>										
Street Sweeping Program	Commercial areas every night, all other areas once per 7 or 10 days as currently practiced	AC ¹	Commercial areas twice per week, all other areas once per week	AC ¹	All streets once per week	AC ¹	All streets once per week	AC ¹	Annually in the spring	AC ¹
Illicit Discharge Detection and Elimination	Continue to detect and correct illegal connections	AC ¹	Continue to detect and correct illegal connections	AC ¹						
Construction Site Controls	Inspect sites subject to Construction Site Runoff Control by-law	AC ¹	Review Drainage Discharge Permits for construction sites	AC ¹						

Table C-1
Maintenance for Muddy River Stormwater Facilities

Maintenance Activity	Brookline		Boston		DCR		Newton		MHD	
Supplemental Activities										
Annual Water Quality Sampling	Sampling three times per quarter at each recommended location									
	Within the Muddy River at: Commonwealth Avenue, Agassiz Road, Boston Gate Houses, Fens Bridge, Longwood Avenue Bridge, Outlet of Leverett Pond, Outlet of Willow Pond, and Outlet of Wards Pond									
	At Drainage Outfalls: Emmanuel College Drain, Longwood Avenue Drain, Tannery Brook Drain, Huntington Avenue, Village Brook Drain, Daisy Field Drain, and Chestnut Street Drain									
		408 hrs/yr ²		408 hrs/yr ²		408 hrs/yr ²				
Public Education and Participation	Annually provide info in utility bills, updates to web page, public television ads, updates to "info-line", and posters/videos for schools	TBD ³	Annually provide info in utility bills, updates to web page, public television ads, updates to "info-line", and posters/videos for schools	TBD ³						
Waterfowl Control	Biannually evaluate for effectiveness, annual egg-oiling, and conduct other waterfowl control techniques	TBD ³	Biannually evaluate for effectiveness, annual egg-oiling, and conduct other waterfowl control techniques	TBD ³						
Pollution Prevention/ Good Housekeeping	Conduct 2 household hazardous waste collections per year and maintain 3 oil collection sites	AC ¹	Conduct 2 household hazardous waste collections per year and provide paint and oil pickup at 4 locations	AC ¹						
Treatment Control BMP Maintenance										
Particle Separators	Seasonal inspections for the first year, then cleaned twice a year	4 hrs / yr / unit	Seasonal inspections for the first year, then cleaned twice a year	4 hrs / yr / unit						
Bioretention Area	Annually mulch and replace tree stakes. Remove litter and debris monthly. Prune, weed, and reseed as required	38 hrs / yr / unit								
Dry Swale and Vegetated Swale	Regular mowing, monthly inspections, correct eroded areas as required, re-seeding as required, and scrape swale bottom and remove sediment every 5 years	24 hrs / yr / unit	Regular mowing, monthly inspections, correct eroded areas as required, re-seeding as required, and scrape swale bottom and remove sediment every 5 years	24 hrs / yr / unit						

- 1. All ready covered by current staff
- 2. Total amount to be split among Brookline, Boston and DCR
- 3. To Be Determined

D

Appendix D

APPENDIX D

DRAFT MEMORANDUM OF AGREEMENT BETWEEN CITY OF BOSTON AND TOWN OF BROOKLINE

- **Draft Memorandum of Agreement**
- **Memorandum from Emerald Necklace Conservancy**
- **MMOC Draft of Memorandum of Agreement**

***** DRAFT *** DRAFT *** DRAFT *** DRAFT *** DRAFT *** DRAFT *****

**MEMORANDUM OF AGREEMENT
BY AND AMONG
THE EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS, THE DEPARTMENT OF CONSERVATION
AND RECREATION¹, THE CITY OF BOSTON, THE TOWN OF BROOKLINE, THE EMERALD
NECKLACE CONSERVANCY, THE MAINTENANCE AND MANAGEMENT OVERSIGHT COMMITTEE,
CONCERNING ROLES AND RESPONSIBILITIES FOR
MAINTENANCE AND MANAGEMENT FOR THE
MUDDY RIVER RESTORATION PROJECT
IN THE CITY OF BOSTON AND THE TOWN OF BROOKLINE**

WHEREAS, Frederick Law Olmsted left the people of the nation and of the Commonwealth of Massachusetts a magnificent historic, cultural and environmental legacy of public parks and open spaces;

WHEREAS, in January of 1984 the Commonwealth of Massachusetts committed itself to reclaiming that legacy by creating the Olmsted Historic Landscape Preservation Program and the “Emerald Necklace Master Plan” of 1990, updated in 2001; and, the Commonwealth’s mission is to preserve significant historic landscapes and to encourage the public’s appreciation, understanding, wise use and maintenance of this historic legacy;

WHEREAS, the health, safety and quality of life of the residents and communities of Boston and Brookline have been threatened by and subject to flooding, impaired water quality and degraded habitat related to the Muddy River in the Boston Park System known as the Emerald Necklace;

WHEREAS, in accordance with a Memorandum of Agreement (“MOA”), dated June 8, 1999, the City of Boston and the Town of Brookline---accepted responsibility for the implementation of the Emerald Necklace Environmental Improvements Master Plan and the Phase I Muddy River Flood Control, Water Quality, Landscape Restoration and Habitat Enhancement Project (EOEA# 11865) (the master plan and the projects contained therein and Phase I for the area between the Charles River and Perkins Street by Jamaica Pond collectively referred to as the “Project”, and the first portion of Phase I referred to as “Charlesgate”);

WHEREAS, the Executive Office of Environmental Affairs (“EOEA”), the Department of Environmental Management, the Massachusetts Emergency Management Agency, the Boston Water and Sewer Commission, the Town of Brookline (“Town”) and the City of Boston (“City”) committed to a Memorandum of Understanding, dated November 4, 1999, concerning the funding and administering of the planning, permitting, and design of Phase I of the Project and the construction and implementation of Charlesgate, and in which the City and Town accepted responsibility for their respective shares of future maintenance and management activities, including the implementation of best management practices, as will be identified in a maintenance and management plan, to be submitted jointly by the City and the Town to the Secretary of Environmental Affairs, and to be reviewed as part of the review for adequacy of the environmental impact report pursuant to the Massachusetts Environmental Policy Act (“MEPA”), sections 61-62H of Chapter 30 of the General Laws and its associated regulations;

¹ The Department of Conservation and Recreation is the successor agency to both the Department of Environmental Management and the Metropolitan District Commission pursuant to Chapters 26 and 41 of the Acts of 2003.

WHEREAS, the Secretary of Environmental Affairs issued pursuant to MEPA a certificate, dated May 1, 2003 reaffirming that maintenance and management are key to ensuring that the Project meets its long-term goals and that the significant public investment in the project, is adequately protected; and the certificate further acknowledges the need and requirement to clearly define the structure, roles and responsibilities, and develop adequate enforceable commitments for long-term maintenance and management of the Project area to protect the substantial investment, both the incurred and anticipated, of federal, state, and local public funds to implement the Project, for which the state is assuming most of the City's and the Town's share of the non-federal portion of the capital costs of the Project in recognition of the commitment by the City and Town to the implementation of such long-term maintenance and management obligations;

WHEREAS, the Secretary of Environmental Affairs required the establishment, pursuant to the Final Record of Decision on the Phase One Waiver concerning Charlesgate, of an independent oversight committee known as the Muddy River Restoration Project Maintenance and Management Oversight Committee ("MMOC");

WHEREAS, the parties firmly believe that ongoing coordination between the Parties, the development of public-private partnerships, fostering public education and participation and the evaluation of the short- and long-term maintenance and management are critical components of ensuring appropriate stewardship of the Project area;

WHEREAS, the parties agree that proper maintenance and management are critical for achieving all of the project goals, as absent these elements, sediment will quickly reaccumulate in the river, degrading water quality and wildlife habitat and endangering the historic landscape with the direct threat of invasive species and the indirect threat of benign neglect;

WHEREAS, the parties to this memorandum (hereinafter the "parties") believe it is appropriate to recognize and outline their respective roles and responsibilities relative to maintenance and management of the Project area to ensure the preservation and protection of this unique Olmsted park system;

NOW, THEREFORE, in order to clearly define the roles and responsibilities for certain maintenance and management activities associated with the Project area, the parties agree as follows:

1. Purpose. The parties commit to this agreement concerning the Project to:
 - (a) protect the substantial public investment to restore, improve, and provide proper stewardship of the natural, recreation, and cultural resources in the Project area;
 - (b) comply with state, federal and local laws and permits, and the anticipated conditions of state and federal project agreements associated with the Project;
 - (c) make clear the roles and responsibilities for the implementation of the required maintenance and management plan in a transparent and comprehensive manner;

(d) establish a framework for ongoing, public participation and evaluation of the progress on the implementation of the maintenance and management plan and associated activities both in the short- and long-term;

(e) foster mechanisms to create and maintain public-private partnerships to support the stewardship and improvement of the natural, recreational and cultural resources;

(f) further consistent, coordinated inter-, intra-, and extra-governmental communications in furtherance of seamless and, from the perspective of the public, transparent implementation of the maintenance and management obligations of various public landowners proximate to the Project.

2. Maintenance and Management.

- (a) The City and the Town shall undertake maintenance and management obligations: as stated in the maintenance and management plan submitted by the City and Town, and reviewed and deemed adequate by the Secretary of Environmental Affairs (“Plan”); any conditions contained in relevant MEPA certificates of the Secretary; and any Section 61 findings issued pursuant to MEPA. Conformance with the Plan by the City and Town shall be considered independent legal obligations, specifically enforceable by the Commonwealth, and shall be incorporated as a condition of any contract for state financial assistance associated with the Project, as well as by any state agency to the extent conformance to the maintenance and management plan is a condition of a permit from that agency, regardless of availability of funds or appropriation by either the City or Town.
- (b) The parties agree that maintenance and management for parklands shall be conducted in accordance with the standards detailed in the plan. A portion of the plan, specifically pertaining to parklands, is attached as Appendix A to this agreement.
- (c) The parties agree that maintenance and management for parkways and roadways shall be conducted in accordance with the standards detailed in the plan. A portion of the plan, specifically pertaining to parkways and roadways, is attached as Appendix B to this agreement.
- (d) The parties agree that maintenance and management for stormwater shall be conducted in accordance with the standards detailed in the plan. A portion of the plan, specifically pertaining to stormwater, is attached as Appendix C to this agreement.
- (e) In a manner consistent with the practices used by City and the Town under the Plan, the DCR will use best management practices for the maintenance and management of the parkways and associated infrastructure under its care, custody and control.

3. Cabinet Management Structure

- (a) The long-term success of the Project is dependant upon maintenance and management in conformance with the maintenance and management plan for the stewardship of resources for which a substantial public investment will be committed. Essential measures in this stewardship include commitments to implementation and maintenance of storm-water best management practices, historic preservation and maintenance of project infrastructure and parklands and parkways. The parties recognize that long-term success of fulfilling project goals cannot be achieved without open lines of communication and sharing of information among the parties and the public, as well as coordination of activities across jurisdictional boundaries and appropriate staffing to implement the maintenance and management plan. To this end, the parties hereby establish a Management Cabinet (the “Cabinet”) to formalize a maintenance and management structure to oversee the Project in furtherance of these purposes and achieving and maintaining the long-term success of the Project.
 - (b) DCR, the City, the Town, the Emerald Necklace Conservancy (“ENC”) and the MMOC, or their respective designees, shall be voting members of the Cabinet, each possessing one vote. The Cabinet shall meet at least quarterly, with one of those meetings being an open and public meeting. A quorum necessary to conduct a meeting of the Cabinet shall consist of a simple majority of the voting members of the Cabinet. All decisions of the Cabinet shall be by made by simple majority of the quorum present at the meeting. The Cabinet shall hold meetings at least quarterly and otherwise as needed.
 - (c) The Cabinet shall have a Chair that shall preside over the Cabinet and its meetings. The Chair shall serve for a term of one year. The Chair shall be elected by a majority vote of the Cabinet.
 - (d) The Cabinet shall serve primarily as a mechanism and forum for high-level management officials to discuss and consider: the range of issues associated with maintenance and management, historic preservation, stewardship and performance standards, including the appropriate capital and operating funding; the implementation, review, potential modification, and enforcement of standards pertaining to these issues; achievements and ongoing cooperation in furtherance of implementing new knowledge and lessons learned in the Project area; any needs of and potential assistance that could be provided by the parties.
 - (e) The Cabinet shall be the forum to facilitate coordination of the implementation of the maintenance and management plan among the parties. While the cabinet shall be the forum to address conformance with the maintenance and management plan, including the standards specified therein, the parties confirm that the Cabinet shall not administer or otherwise control day-to-day management or operation of any park lands, including lands, facilities, parkways or water courses, under the care and control of either the City, the Town or DCR; it being expressly understood that such is reserved to the City, the Town and DCR, respectively.
4. Maintenance and Management Oversight Committee (MMOC)
- (a) The parties agree that proper maintenance and management of the Project area are critical for achieving project goals, and that implementation of a continuing, independent

oversight body for the Project is essential to meeting these goals continually for the long-term and protecting the significant public investment in the Project. The parties agree that the MMOC, referenced and described in the MEPA Certificate dated May 1, 2003, shall fulfill such a role in the project management structure associated with the Project. The parties agree to communicate and share information with the MMOC, so that the MMOC may fulfill its function. The MMOC shall communicate and share information directly with the parties, so that the parties may fulfill their functions, including maintenance and management obligations as applicable. The MMOC shall inform the Cabinet of outstanding issues that require consideration and resolution.

- (b) The MMOC shall consist of a member from the following agencies or organizations (or their designee from within that agency or organization) provided that the Secretary, in her discretion, may add to or remove members from the MMOC:

[insert list]

- (c) Without limiting the role of the MMOC, the MMOC shall provide the primary forum and conduit for public participation in the independent review, oversight and decision-making process of the parties associated with the maintenance and management of the resources within the Project area. The MMOC shall endeavor to hold monthly meetings and additional meetings as necessary.
- (d) In implementing its role as described in paragraph (b), the MMOC shall have the following responsibilities: review and evaluate the implementation and progress of construction activities and maintenance and management standards; evaluate progress and provide independent oversight of maintenance and management activities; provide independent review and comment concerning reports and filings related to the Project area; monitor and evaluate compliance with permit, contract and legal obligations associated with the Project, including Section 61 findings; promote coordination and communication concerning maintenance and management activities among the Parties and the public; encourage representation of a broad public constituency on the MMOC; serve as a conduit for public participation and access to information concerning maintenance and management of the Project area; and report frequently any issues to the Cabinet for its discussion and consideration.
- (e) The Town and the City shall provide funding for the duration of the construction of the Project plus five years to support certain activities of the MMOC. Funding shall include \$35,000 per year from the City, \$20,000 per year from the Town, \$20,000 per year from DCR. . Funding for the MMOC shall be administered and distributed both in a manner and through a qualified organization acceptable to the parties *[Insert additional fiscal procedures text]*.

5. Role of the Emerald Necklace Conservancy

- (a) The ENC shall use best efforts to work with the Parties to assess and identify annual funding necessary for the maintenance and management of the Project area, funding for the administration and activities, and to assist DCR, the City and the Town to secure the necessary annual funding for DCR's, the City's and the Town's maintenance and management and capital obligations.

- (b) The ENC will facilitate the development of partnerships among the Parties and non-profit organizations; act as a liaison with the cultural and educational institutions in the neighborhoods along the Muddy River; and develop and implement public education and other programs to promote an understanding and appreciation of the landscape, waterways, parkways and features of the Emerald Necklace.
- (c) The ENC shall assist the Cabinet in its administration through, at the request of the Cabinet: assisting in convening meetings; identifying locations of Cabinet meetings; and disseminating materials relating to Cabinet meetings and activities.

6. Dispute Resolution.

In the event of a dispute related to this Agreement, the parties shall use the following as a condition precedent to either party pursuing other available remedies:

- (a) A party who believes a dispute exists (the “disputing party”) shall put such dispute in writing to the other party (the “responding party”). Such writing shall clearly, though as briefly as practicable, state the substance and scope of the dispute, the disputing party’s position relative thereto, including legal and factual justifications therefore, the remedy sought, and any other pertinent matters.
- (b) The responding party shall respond in writing to the disputing party within ten (10) days of receiving such writing. Such writing shall clearly, though as briefly as practicable, state the responding party’s response to each of the items included in the disputing party’s writing, and any other pertinent matters.
- (c) A telephone conference shall be held within ten (10) days between representatives of the parties having decision-making authority regarding the dispute, to negotiate in good faith a resolution of the dispute.
- (d) If, within ten (10) business days after such telephone conference, the parties have not succeeded in negotiating a resolution of the dispute, the parties’ representatives shall submit the dispute to mediation by contacting the MA Office of Dispute Resolution (MODR), who will administer the mediation process. The fees of, and authorized expenses incurred by, the mediation shall be shared equally by the parties.
- (e) The parties hereby agree to mediate in good faith for a minimum period of ten (10) days from the actual commencement of the mediation. If the parties are not successful in resolving the dispute through mediation, then the parties may agree to submit the matter to binding arbitration, or either party may pursue other available remedies upon ten (10) days written notice to the other party specifying its intended course of action. Any decision associated with the resolution of a dispute shall be presented and ratified at a meeting of the Cabinet.
- (f) The parties may mutually agree to extend any of the time periods stated herein.

- (g) The parties agree that the mediation provided for here is a compromise negotiation for purposes of all international, federal and state rules of evidence. The entire procedure will be confidential to the extent permitted by law. All conduct, statements, promises, offers, views and opinions, whether oral or written, made in the course of the mediation by any of the parties, their agents, employees, representatives or other invitees to the mediation and by the neutral, who is the parties' joint agent for the purpose of these compromise negotiations, are confidential and shall, in addition and where appropriate, be deemed to be privileged. Such conduct, statements, promises, offers, views and opinions shall not be discoverable or admissible for any purposes, including impeachment, in any litigation or other proceeding involving the parties and shall not be disclosed to anyone not an agent, employee, expert, witness, or representative for any of the parties. However, evidence otherwise discoverable or admissible in a later proceeding is not excluded from discovery or admission as a result of its use in the mediation. If not entirely enforceable, the parties intend that the court enforce this provision to the extent enforceable by such court.
- (h) The parties agree that nothing contained herein shall affect or limit, in any way, any party, as applicable, from independently exercising or enforcing its authority under any applicable statute, regulation or other provision of law that it is charged with administering.
7. US Army Corps of Engineers Project Agreement Conditions. The parties recognize that certain obligations and conditions will be associated with the Project that must be fulfilled by certain parties independent of this memorandum as part of any project agreement for the Project with the United States Army Corp of Engineers and local, state and federal project permits. The parties agree, however, that fulfillment of those conditions and obligations (in force or as lawfully modified) by the relevant parties shall be considered binding maintenance and management obligations under this memorandum.
8. Nothing in this memorandum, except as expressly stated, shall be construed to diminish, enlarge or modify any right or liability of any of the parties, or create liability on the part of any public agency for the act or omission of another public agency or a private person. Nothing in this memorandum shall be construed to amend, repeal or otherwise alter the authority or jurisdiction of any public agency. Nothing in this memorandum, including any process established herein, shall be construed to amend, repeal or otherwise alter any mitigation commitment, obligation or requirement pursuant to MEPA.

9. Effective Date and Term. The effective date of this agreement shall be the date of execution by the last of the parties to sign. The agreement shall remain in effect from the effective date and shall not expire until thirty-years from the completion date of the capital investments of the Project, unless the term is extended or modified with the unanimous agreement of all of the parties. This duration of the agreement represents the currently estimated expected life of the capital investments implemented, if maintained as anticipated, as part of the Project.

**For the Executive Office of
Environmental Affairs:**

Secretary Ellen Roy Herzfelder

Date: _____

**For the Department of
Conservation and Recreation:**

Commissioner Katharine Abbott

Date: _____

**For the Boston Parks and
Recreation Department:**

Commissioner Antonia Pollack

Date: _____

**For the Brookline Public
Works Department:**

Commissioner Thomas DeMaio

Date: _____

For the MMOC:

For the ENC:

Memorandum – Via e-mail and mail

to: Jim Hunt, MEPA
from: Simone Auster, ENC
date: December 21, 2004
re: Muddy River Restoration Project Memorandum of Agreement (MOA)

This memorandum summarizes the Emerald Necklace's Conservancy's ("ENC") major comments and questions on the first draft of the Memorandum of Agreement ("MOA") that you circulated. While this memo focuses on the major issues that are of concern to the ENC, we would also be happy to provide you with our proposed language changes and other content suggestions either in connection with this current draft or the next revised draft. We look forward to finalizing this agreement with you and the other parties.

1. **ENC Roles and Responsibilities:** We have drafted a new Section 5 of the MOA to replace the section in your current draft, and have enclosed that re-drafted section with this memo. The new provisions expand upon what we believe should be the ENC's dynamic role in connection with the Project and the Necklace as a whole. Please let us know if you have any comments on this revised section.
2. **Cabinet Management Structure:** We propose a number of changes to Section 3 in order to shore up the Cabinet's structure and procedures:
 - Section 3(b) should specify which individuals will serve as the Cabinet representatives for each party. Paragraph (d) calls for "high-level" officials, yet the Section does not specify who the representatives will be. The parties should agree on their representatives in advance.
 - As drafted, Section 3(b) requires three of the five Cabinet members in attendance for a quorum, and then allows that quorum to act on behalf of the Cabinet with a vote of the majority in attendance. That provision means that the Cabinet could act even if only two of the five members agree. We believe that the decisions of the Cabinet should require a higher degree of agreement to give the Cabinet's actions more legitimacy and a greater likelihood of enforceability. Please consider requiring three out of the five Cabinet members to agree on any decision; if a

quorum consists of only three members, all three must vote to take a given action.

- Section 3(b) should include additional detail about the process for calling special meetings. We suggest that the Chair should have the power to call such meetings, and that other parties should be able to call a limited number of special meetings per year.

- The version of the MOA drafted by the ENC's counsel (and discussed by a working group of representatives of the ENC, MMOC and the proponents) addressed each of the issues noted above, as well as additional details regarding the Cabinet's management procedures. If you would like a copy of that section for your reference, we would be happy to provide it.

3. **MMOC's Roles and Responsibilities:** While the ENC recognizes the important role that the MMOC will play in the Project, we propose certain revisions to the description of that role. Section 4(a) should make clear that while the parties agree to reasonably share information related to the Project with the MMOC, each other party retains a right to safeguard information related to its public or private organizational mission as it sees fit (or in the case of the public parties, as far as the Public Records Law will allow). In addition, Section 4(c) should be revised to clarify that the MMOC's direct participation in the "decision-making process of the parties" is limited to its role on the Cabinet, although the other parties will, of course, welcome any MMOC input at any time.
4. **Term:** The ENC proposes that the MOA's term consist of an initial term, which would expire five years from Project completion, followed by five-year extension terms that run automatically unless the parties agree to terminate the MOA, up to a total term of thirty years.
5. **Dispute Resolution:** We suggest that before two parties bring a dispute to the MODR, they should submit the dispute to the Cabinet for discussion. That step might generate a resolution agreeable to both parties, and thereby avoid the time-consuming and costly mediation process. Also, we would eliminate the requirement that the Cabinet ratify the results of mediations or arbitrations; as drafted, the MOA does not explain what would happen in the event that the Cabinet refused to ratify such result.

6. **Maintenance of Parkways and Roadways**: Section 2(c) appears to require that all parties (which would include DCR) will maintain and manage roadways in accordance with the Maintenance and Management Plan. Section 2(e), however, seems only to require DCR to maintain and manage the parkways “in a manner consistent with the practices used by City and the Town under the Plan.” We believe that DCR should commit to follow the standards set forth in the Plan, in order to promote consistent maintenance and management practices throughout the Necklace.

cc: Antonia Pollak, Margaret Dyson – Boston Parks Department
Erin Chute – Brookline Parks and Open Space
Marjorie Bakken - Chair, Emerald Necklace Conservancy
Peter Kochansky, Esq. – Goulston & Storrs

5. Role of the Emerald Necklace Conservancy

The Emerald Necklace Conservancy's role in the Muddy River Restoration Project may include but not be limited to facilitation and provision of private sector and community input to, and support for, the Project and related Emerald Necklace activities. Such input and support may take the form of:

- Advocacy on behalf of the Project and related Emerald Necklace issues;
- Review of budgets and contracts related to Project activities, as required; including compliance with MOUs and other project agreements;
- Assessment of on-going parks maintenance in light of established maintenance standards;
- Assist the Cabinet in its administration, including but not limited to serving as meeting convener; developing meeting agendas and collecting materials related to Cabinet meetings and activities; helping to identify priority projects related to restoration and maintenance; monitoring maintenance and other standards; and implementing reviews of agreed-upon plans;
- Promotion and implementation of volunteer/stewardship initiatives;
- Planning and facilitation of Project outreach and related public dialogue, as required, including ensuring coordination with, and collaboration among, the numerous non-profit organizations, residential groups and institutions surrounding the Emerald Necklace.
- Advocacy to ensure adequate project funding, including the continuation of the Conservancy's role as convener of the Project "funding coalition;"
- Implementation of public education efforts, including: sponsorship of public meetings on Project issues and progress; presentations, a newsletter, web site and other communications, as required, in order to raise public awareness of the Project and related issues such as parks restoration and maintenance.
- Encourage individuals to donate financial resources toward improvement of the park system in order to supplement and extend the capabilities of the public sector without replacing the public sector's responsibility for baseline maintenance and related funding;

- Establish cooperative management, restoration and maintenance projects in the parks, and collaborative masterplanning, as required; and,
- Develop, through the established public-private partnership, consistent Emerald Necklace standards (i.e., lighting, benches, trash barrels and other infrastructure) to ensure a seamlessly managed and maintained, and readily identifiable, park system.

MEMORANDUM OF AGREEMENT

BY AND AMONG

**THE EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS, THE DEPARTMENT OF CONSERVATION AND RECREATION¹, THE CITY OF BOSTON, THE TOWN OF BROOKLINE, THE EMERALD NECKLACE CONSERVANCY, THE MUDDY RIVER RESTORATION PROJECT MAINTENANCE AND MANAGEMENT OVERSIGHT COMMITTEE
CONCERNING ROLES AND RESPONSIBILITIES FOR
MAINTENANCE AND MANAGEMENT FOR THE
MUDDY RIVER RESTORATION PROJECT
IN THE CITY OF BOSTON AND THE TOWN OF BROOKLINE**

WHEREAS, Frederick Law Olmsted left the people of the nation and of The Commonwealth of Massachusetts a magnificent historic, cultural and environmental legacy of public parks and open spaces;

WHEREAS, in January of 1984 the Commonwealth of Massachusetts committed itself to reclaiming that legacy by creating the Olmsted Historic Landscape Preservation Program and the "Emerald Necklace Master Plan" of 1990, updated in 2001; and, the Commonwealth's mission is to preserve significant historic landscapes and to encourage the public's appreciation, understanding, wise use and maintenance of this historic legacy;

WHEREAS, the health, safety and quality of life of the residents and communities of Boston and Brookline have been threatened by and subject to flooding, impaired water quality and degraded habitat related to the Muddy River in the Boston Park System known as the Emerald Necklace;

WHEREAS, in accordance with a Memorandum of Agreement ("MOA"), dated June 8, 1999, the City of Boston and the Town of Brookline---accepted responsibility for the implementation of the Emerald Necklace Environmental Improvements Master Plan and the Phase I Muddy River Flood Control, Water Quality, Landscape Restoration and Habitat Enhancement Project (EOEA# 11865) (the master plan and the projects contained therein and Phase I for the area between the Charles River and Perkins Street by Jamaica Pond collectively referred to as the "Project", and the first portion of Phase I referred to as "Charlesgate");

WHEREAS, the goals of the Project include, but are not limited to, flood control, water quality improvements, habitat enhancements and historic preservation of the Project area, which includes the parkways that surround the Project and the storm water drainage systems that serve it and are within the care, custody and control of each of the signatories to this Memorandum of Agreement;

¹ The Department of Conservation and Recreation is the successor agency to both the Department of Environmental Management and the Metropolitan District Commission pursuant to Chapters 26 and 41 of the Acts of 2003.

WHEREAS, the parties recognize that the unique nature of this historic landscape located in multiple jurisdictions offers the parties a unique opportunity to work together cooperatively to ensure outstanding stewardship of the entire Project area;

WHEREAS, the Executive Office of Environmental Affairs (“EOEA”), the Department of Environmental Management, the Massachusetts Emergency Management Agency, the Boston Water and Sewer Commission, the Town of Brookline (“Town”) and the City of Boston (“City”) committed to a Memorandum of Understanding, dated November 4, 1999, concerning the funding and administering of the planning, permitting, and design of Phase I of the Project and the construction and implementation of Charlesgate, and in which the City and Town accepted responsibility for their respective shares of future maintenance and management activities, including the implementation of best management practices, which are identified in a maintenance and management plan, submitted jointly by the City and the Town to the Secretary of Environmental Affairs, and reviewed as part of the review for adequacy of the environmental impact report pursuant to the Massachusetts Environmental Policy Act (“MEPA”), sections 61-62H of Chapter 30 of the General Laws and its associated regulations, and which maintenance and management plan is attached hereto and incorporated herein (the “Plan”);

WHEREAS, pursuant to MEPA the Secretary of Environmental Affairs issued a certificate, dated May 1, 2003 reaffirming that maintenance and management are key to ensuring that the Project meets its long-term goals and that the significant public investment in the project is adequately protected; and the certificate further acknowledges the need and requirement to clearly define the structure, roles and responsibilities, and develop adequate enforceable commitments for the short-term and long-term maintenance and management of the Project area to protect the substantial investment, both the incurred and anticipated, of federal, state, and local public funds to implement the Project, for which the state is assuming most of the City’s and the Town’s share of the non-federal portion of the capital costs of the Project in recognition of the commitment by the City and Town to the implementation of such long-term maintenance and management obligations;

WHEREAS, the Division of Conservation and Recreation (“DCR”) also recognizes the critical importance of maintenance and management of the Project area and is committed to maintaining and managing the parkways and other areas within and abutting the Project area that are subject to its care, custody and control to the same standard to which the City and the Town are obligated to maintain the areas subject to their respective care, custody and control;

WHEREAS, the Secretary of Environmental Affairs required the establishment, pursuant to the Final Record of Decision on the Phase One Waiver concerning Charlesgate, of an independent oversight committee known as the Muddy River Restoration Project Maintenance and Management Oversight Committee (“MMOC”);

WHEREAS, the Emerald Necklace Conservancy is a non profit corporation organized and existing for the purpose of contributing to the protection, restoration and preservation of the landscape, waterways and parkways of the Emerald Necklace park system as special places for people to visit and enjoy;

WHEREAS, the signatories to this Memorandum of Agreement (together, the “parties”) firmly believe that ongoing coordination and cooperation among the parties, the development of public-private partnerships, fostering public education and participation and the implementation of effective short- and long-term maintenance and management systems are critical components to ensuring effective stewardship of the Project area and the preservation of this significant and historic public resource;

WHEREAS, the parties agree that proper maintenance and management of the Project area are critical for achieving all of the project goals, as absent these elements, sediment will quickly reaccumulate in the river, degrading water quality and wildlife habitat and endangering the historic landscape with the direct threat of invasive species and the indirect threat of benign neglect;

WHEREAS, the parties believe it is appropriate to recognize and outline their respective roles and responsibilities relative to maintenance and management of the Project area to ensure the preservation and protection of this unique Olmsted park system;

NOW, THEREFORE, in order to clearly define the roles and responsibilities of the parties to this Memorandum of Agreement for maintenance and management activities associated with the Project area, the parties agree as follows:

1. Purpose.

The parties to this Memorandum of Agreement concerning the Project (the “Agreement”) hereby each commit to:

- (a) protect the substantial public investment in and to restore, improve, and provide proper stewardship for the natural, recreation, and cultural resources in the Project area;
- (b) comply with state, federal and local laws and permits, and the conditions and requirements of all existing and anticipated state and federal project agreements associated with the Project;
- (c) make clear the roles and responsibilities for the implementation of the required maintenance and management plan in a transparent and comprehensive manner;
- (d) establish a framework for ongoing, public participation and evaluation of the progress on the implementation of the maintenance and management plan and associated activities both in the short- and long-term;
- (e) foster mechanisms to create and maintain public-private partnerships to support the stewardship and improvement of the natural, recreational and cultural resources;
- (f) wherever possible, put aside jurisdictional barriers and boundaries and work collaboratively to implement the maintenance and management obligations of the various public landowners with respect to the Project area in a seamless and transparent manner,

and to respect both the specific processes of and the spirit of this unique inter-governmental agreement which may serve as a model for other multi-governmental projects for decades to come; and

- (g) maintain open and consistent communication among themselves regarding any matter which affects the Project or the Project area.

2. Maintenance and Management.

The parties recognize and agree that a substantial public investment is being made in the Project and that the long-term success of the Project is dependant upon responsible and effective stewardship of the entire Project area and maintenance and management in conformance with the standards detailed in and the specific provisions of the maintenance and management plan submitted by the City and Town, and reviewed and deemed adequate by the Secretary of Environmental Affairs ("Plan"). Essential measures in this stewardship include commitments to implementation and maintenance of storm-water best management practices, historic preservation and maintenance of project infrastructure and parklands and parkways. Therefore, the parties hereby agree to the following with respect to maintenance and management of the Project area:

- (a) The parties agree that the parklands within the Project area shall be maintained and managed in accordance with the standards detailed in and the specific provisions of the Plan.. That portion of the Plan specifically pertaining to parklands is attached hereto and incorporated herein as Appendix A to this Agreement.
- (b) The parties agree that the parkways and roadways within the Project area shall be maintained and managed in accordance with the standards detailed in and the specific provisions of the Plan. That portion of the Plan, specifically pertaining to parkways and roadways is attached hereto and incorporated herein as Appendix B to this Agreement.
- (c) The parties agree that the stormwater drainage system within the Project area shall be maintained and managed in accordance with the standards detailed in and the specific provisions of the Plan. That portion of the Plan specifically pertaining to stormwater drainage is attached hereto and incorporated herein as Appendix C to this Agreement.
- (d) The City and the Town shall each implement the maintenance and management obligations stated in the Plan, any conditions contained in relevant MEPA certificates of the Secretary, any Section 61 findings issued pursuant to MEPA, and the requirements of any permit or approval issued in connection with the Project, with respect to those portions of the Project area that are within their respective care, custody or control.
- (e) Compliance with the Plan by the City and by the Town shall be incorporated as conditions of any contract for state financial assistance associated with the Project, and any permits and approvals granted by any state agency with respect to the Project;

- (f) Compliance with the Plan by the City and by the Town shall be considered independent legal obligations, each of which shall be specifically enforceable by the Commonwealth, and also by any state agency to the extent that compliance with the Plan or any part of it is a condition of a permit or approval issued by that agency, and such rights of specific enforcement shall exist regardless of the availability of funds or appropriations by either the City or the Town.
- (g) In a manner consistent with the practices used by the City and the Town under the Plan, DCR shall maintain and manage the parklands, parkways, storm water drains and other infrastructure within or affecting the Project area that are under its care, custody and control, and in doing so shall implement the maintenance and management standards and practices set forth in the Plan.
- (h) The Town, the City and DCR agree to work cooperatively to ensure consistent and seamless maintenance and management of those portions of Project area within their respective care, custody and control, and the ENC and the MMOC agree to work cooperatively with them to achieve these goals.
- (i) The Town, the City and DCR each agree to provide sufficient staffing to implement the maintenance and management standards set forth in the Plan for all portions of the Project area within their respective care, custody and control.
- (j) The parties agree to work cooperatively to urge other landowners, both public and private, which own or control either land or infrastructure which abuts or affects the Project area to implement maintenance and management practices which are consistent with those set forth in the Plan.

3. Creation of Cabinet and its Management Structure.

The parties recognize and agree that long-term success in fulfilling the Project goals cannot be achieved without open lines of communication and sharing of information among the parties to this Agreement and the public, coordination of activities across jurisdictional boundaries and appropriate staffing to implement the maintenance and management plan. To this end, the parties hereby establish a Management Cabinet (the "Cabinet") to formalize a maintenance and management structure to oversee the Project in furtherance of these purposes and achieving and maintaining the long-term success of the Project.

- (a) The Cabinet shall serve primarily as a mechanism and forum for high-level management officials to discuss, consider, resolve and implement decisions made with respect to: the range of issues associated with maintenance and management, historic preservation, stewardship and performance standards, including the appropriate capital and operating funding; the implementation, review, potential modification, and enforcement of standards pertaining to these issues; achievements; ongoing cooperation in furtherance of implementing new knowledge and lessons learned in the Project area; and any needs for and potential assistance that could be provided by the parties.

- (b) The Cabinet shall be the forum through which the parties shall facilitate coordination of the implementation by the parties of the Plan, and address compliance of the parties with the Plan, including the standards specified therein. Notwithstanding the foregoing, the parties specifically recognize and agree that the Cabinet shall not administer or otherwise control the day-to-day management or operation of any parklands, including lands, facilities, parkways or water courses that are under the care, custody or control of either the City, the Town or DCR; it being expressly understood that such is reserved to the City, the Town and DCR, respectively.
 - (c) The Cabinet shall have five (5) members, the City, the Town, DCR, the ENC and the MMOC, each of which shall designate a representative to serve on the Cabinet. Each member of the Cabinet shall have one vote.
 - (d) The Cabinet shall hold meetings at least quarterly, and otherwise as reasonably requested by any party, and as otherwise needed. At least one meeting each year shall be an open and public meeting.
 - (e) A quorum necessary to conduct a meeting of the Cabinet shall consist of not less than four (4) of the members of the Cabinet. The parties shall make an effort to make all decisions by consensus; but in no event shall any decision of the Cabinet be made by vote of fewer than four (4) members.
 - (f) The MMOC representative shall preside over the meetings of the Cabinet. *(Please note that the MMOC proposes that it chair the meetings as a service to the Cabinet and for consistency since in its oversight role, it has the widest constituency, encompassing not only the specific organizations represented in its membership, but other park advocacy groups and the public at large as well. The MMOC does not consider that the proposal on this issue stated in the original draft of the MOA provides a workable arrangement.)*
4. Muddy River Restoration Project Maintenance and Management Oversight Committee (MMOC).

The parties agree that proper maintenance and management of the Project area are critical to achieving the Project goals, and that implementation of a continuing, independent oversight body for the Project is essential to meeting these goals consistently in both the short and the long-term and to protecting the significant public investment in the Project. The parties agree that the MMOC, referenced and described in the MEPA Certificate dated May 1, 2003, shall fulfill such a role in the project management structure associated with the Project.

Because the MMOC has the widest and most inclusive constituency of all the parties to this Agreement, serves as the formal vehicle for public participation in the Project, , provides ongoing independent evaluation of the Project and serves, when necessary, as an outspoken watchdog to ensure outstanding stewardship of the Project area, the MMOC has a unique and critically important function on the Cabinet. Therefore, the parties agree as follows:

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- (a) In order to enable the MMOC to fulfill its function, the parties agree to communicate in good faith and to share directly with the MMOC all information and documentation relating to the Project that are either requested by the MMOC or recognized by another party to be relevant to the Project or the maintenance and management of the Project area, so that the MMOC may fulfill its function. The MMOC shall communicate and share information directly with all parties, so that the parties may fulfill their functions, including maintenance and management obligations as applicable. The MMOC shall inform the Cabinet of outstanding issues that require consideration and resolution.
- (b) The MMOC shall consist of a member (except as otherwise indicated) from each of the agencies and organizations listed in Paragraphs 4 (c) and 4(d) (or the designee from within that agency or organization). Members representing the organizations listed in this Paragraph 4(c) shall be voting members of the MMOC, and those representing the agencies listed in Paragraph 4(d) shall be non-voting ex officio members of the MMOC. The Secretary, in her discretion, may add or remove member agencies and organizations from the MMOC, and shall consider the recommendations of the MMOC itself with respect to organizations and agencies which should be represented on the MMOC.
- (c) Except for the Emerald Necklace Citizens Advisory Committee, each of the following organizations shall have one (1) representative on the MMOC who shall be a voting member of the MMOC:

- Boston GreenSpace Alliance
- Boston Society of Landscape Architects
- Brookline GreenSpace Alliance
- Charles River Watershed Association
- Emerald Necklace Conservancy
- The Fenway Alliance
- Massachusetts Audubon Society
- Muddy River Restoration Project Technical Advisory Committee

The Emerald Necklace Citizens Advisory Committee shall have four (4) representatives on the MMOC, which shall include representatives from Boston and from Brookline, and each such representative shall be a voting member of the MMOC.

- (d) Each of the following agencies and organizations shall have one (1) representative on the MMOC, who shall be a non-voting, ex officio member of the MMOC:

- Boston Landmarks Commission
- Boston Parks and Recreation Department
- Brookline Parks and Open Space Division
- Brookline Preservation Commission
- Massachusetts Emergency Management Agency
- Massachusetts Executive Office of Environmental Affairs
- Massachusetts Historic Commission

Representatives from appropriate divisions of the Massachusetts Department of Conservation and Recreation

- (e) Without limiting the role of the MMOC, the MMOC shall provide the primary forum and conduit for public participation in the independent review, oversight and decision-making process of the parties associated with the maintenance and management of the resources within the Project area. The MMOC shall endeavor to hold monthly meetings and additional meetings as necessary.
- (f) In implementing its role as described in this Paragraph 4, the MMOC shall have the following responsibilities: review and evaluate the implementation and progress of construction activities and maintenance and management standards; evaluate progress and provide independent oversight of short and long-term maintenance and management activities; provide independent review and comment concerning reports and filings related to the Project area; monitor and evaluate compliance with permit, contract and legal obligations associated with the Project, including Section 61 findings; promote coordination and communication concerning maintenance and management activities among the Parties and the public; encourage representation of a broad public constituency on the MMOC; serve as a conduit for public participation and access to information concerning maintenance and management of the Project area; and report frequently to the Cabinet any issues for its discussion and consideration.
- (g) The Town, the City and DCR or other appropriate state agency shall provide funding for the duration of the construction of the Project plus five years to support the activities of the MMOC. Funding shall be not less than \$35,000 per year from the City, \$20,000 per year from the Town, and \$20,000 per year from DCR. Funding for the MMOC shall be administered and distributed both in a manner and through a qualified organization acceptable to the governmental entities that are parties to this Agreement. Such parties recognize that at the time of execution of this Agreement, Mission Hill Main Streets is serving as the MMOC's fiscal agent and they agree that such organization is qualified and acceptable to serve in such capacity. The MMOC shall internally manage the funds through procedures established by the MMOC and overseen by its Steering Committee. The MMOC shall provide an annual financial report to MEPA, the City, the Town and DCR.

5. Role of the Emerald Necklace Conservancy.

- (a) The ENC shall use best efforts to work with the other parties to assess and identify annual funding necessary for the maintenance and management of the Project area, funding for the administration and activities, and to assist DCR, the City and the Town to secure the necessary annual funding for DCR's, the City's and the Town's maintenance and management and capital obligations.
- (b) The ENC will facilitate the development of partnerships among the Parties and non-profit organizations; act as a liaison with the cultural and educational institutions in the neighborhoods along the Muddy River; and develop and implement public education and

other programs to promote an understanding and appreciation of the landscape, waterways, parkways and features of the Emerald Necklace.

- (c) The ENC shall assist the Cabinet in its administration through, at the request of the Cabinet: assisting in convening meetings; identifying locations of Cabinet meetings; and disseminating materials relating to Cabinet meetings and activities.

6. Dispute Resolution.

In the event of a dispute related to this Agreement or the Project, the parties shall use the following as a condition precedent to any party pursuing other available remedies, including legal remedies. Notwithstanding the foregoing, the parties are committed to trying to resolve all issues that relate to this Agreement and the Project informally and expeditiously through the Cabinet, and agree that for the purposes of this Paragraph 6, there shall not be a dispute until such informal efforts through the Cabinet shall have been ineffective:

- (a) A party who believes a dispute exists (the “disputing party”) shall give written notice of such dispute in writing to the party or parties involved in the dispute (the “responding party” or the “responding parties”), and shall provide a copy of such notice simultaneously to each other party to this Agreement. Such notice shall clearly, though as briefly as practicable, state the substance and scope of the dispute, the disputing party’s position relative thereto, including legal and factual justifications therefore, the remedy sought, and any other pertinent matters.
- (b) The responding party or Parties shall respond in writing to the disputing party within ten (10) days of receiving such notice, and shall send a copy of such response to each of the other parties to this Agreement. Such writing shall clearly, though as briefly as practicable, state the responding party’s (of parties’) response to each of the items included in the disputing party’s writing, and any other pertinent matters.
- (c) A telephone conference shall be held within ten (10) days between representatives of the parties having decision-making authority regarding the dispute, to negotiate in good faith a resolution of the dispute.
- (d) If, within ten (10) business days after such telephone conference, the parties have not succeeded in negotiating a resolution of the dispute, the parties’ representatives shall submit the dispute to mediation by contacting the MA Office of Dispute Resolution (MODR), who will administer the mediation process. The fees of, and authorized expenses incurred by, the mediation shall be shared equally by the parties.
- (e) The parties hereby agree to mediate in good faith for a minimum period of ten (10) days from the actual commencement of the mediation. If the parties are not successful in resolving the dispute through mediation, then the parties may agree to submit the matter to binding arbitration, or either party may pursue other available remedies upon ten (10) days written notice to the other party specifying its intended course of action. Any

decision associated with the resolution of a dispute shall be presented and ratified at a meeting of the Cabinet.

- (f) The parties may mutually agree to extend any of the time periods stated herein.
- (g) The parties agree that the mediation provided for here is a compromise negotiation for purposes of all international, federal and state rules of evidence. The entire procedure will be confidential to the extent permitted by law. All conduct, statements, promises, offers, views and opinions, whether oral or written, made in the course of the mediation by any of the parties, their agents, employees, representatives or other invitees to the mediation and by the neutral, who is the parties' joint agent for the purpose of these compromise negotiations, are confidential and shall, in addition and where appropriate, be deemed to be privileged. Such conduct, statements, promises, offers, views and opinions shall not be discoverable or admissible for any purposes, including impeachment, in any litigation or other proceeding involving the parties and shall not be disclosed to anyone not an agent, employee, expert, witness, or representative for any of the parties. However, evidence otherwise discoverable or admissible in a later proceeding is not excluded from discovery or admission as a result of its use in the mediation. If not entirely enforceable, the parties intend that the court enforce this provision to the extent enforceable by such court.
- (h) The parties agree that nothing contained herein shall affect or limit, in any way, any party, as applicable, from independently exercising or enforcing its authority under any applicable statute, regulation or other provision of law that it is charged with administering.

7. U.S. Army Corps of Engineers Project Agreement Conditions.

The parties recognize that certain obligations and conditions associated with the Project must be fulfilled by certain parties independent of this memorandum as part of any project agreement for the Project with the United States Army Corp of Engineers and local, state and federal project permits. The parties agree, however, that fulfillment of those conditions and obligations (in force or as lawfully modified) by the relevant parties shall be considered binding maintenance and management obligations under this Agreement..

8. Rights and Liabilities of the Parties.

Nothing in this Agreement, except as expressly stated, shall be construed to diminish, enlarge or modify any right or liability of any of the parties, or create liability on the part of any public agency for the act or omission of another public agency or a private person. Nothing in this Agreement shall be construed to amend, repeal or otherwise alter the authority or jurisdiction of any public agency. Nothing in this Agreement, including any process established herein, shall be construed to amend, repeal or otherwise alter any mitigation commitment, obligation or requirement pursuant to MEPA.

9. Effective Date and Term.

The effective date of this Agreement shall be the date of execution by the last of the parties to sign. The Agreement shall remain in effect from the effective date and shall not expire until thirty (30) years from the completion date of the capital investments of the Project, unless the term is extended or modified with the unanimous agreement of all of the parties. This duration of the Agreement represents the currently estimated expected life of the capital investments implemented, if maintained as anticipated, as part of the Project.

**For the Executive Office of
Environmental Affairs:**

**For the Department of
Conservation and Recreation:**

Secretary Ellen Roy Herzfelder

Commissioner Katharine Abbott

Date: _____

Date: _____

**For the Boston Parks and
Recreation Department:**

**For the Brookline Public
Works Department:**

Commissioner Antonia Pollack

Commissioner Thomas DeMaio

Date: _____

Date: _____

For the MMOC:

For the ENC:

Date: _____

Date: _____

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